PURCHASING

AUGUST, 1940....CONTENTS

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in Business for Your Safety

AMERICAN CABLE

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More than thirty years ago Weed Tire Chains were put on the market to make motoring safer. Thus the American Chain and Cable Company was conceived in Safety and has always been dedicated to that ideal. Today ACCO products are to be found serving faithfully and safely in nearly every field.

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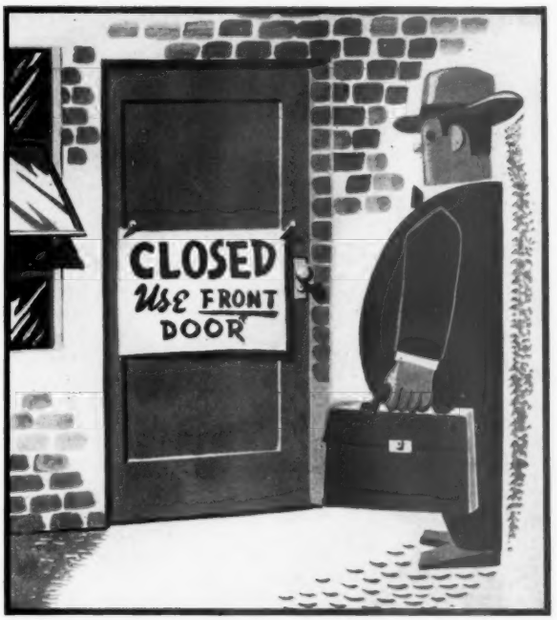
Sell to Industry by the Front Door



AS purchasing for national defense requirements gets under way, and War Department order lists are released, it becomes increasingly evident that this vast procurement program is reaching into every corner of our manufacturing plant. It is hard to find a single type of industry, however remote from military considerations it may seem to be in any normal appraisal of its activities, that does not now have a part in providing the equipment and materials for our defense organization.

War production involves special responsibilities. One result of the situation is that salesmen are learning it is no longer easy, or even possible, to roam through factories at will and talk to operating men. In most cases it is necessary to secure a pass, sometimes a guide, in order to reach the representative they wish to see on even a routine call. The back door and the by-pass are closed, and the purchasing office has become the point of contact, as it was always intended to be.

In the matter of industrial organization we have been as informal and easy-going as in national defense itself. Management has frequently admitted that this was not the proper nor desirable procedure, but has not insisted upon technicalities of authority and standard channels of approach. Now through the force of necessity and national interest, those formalities are being observed. It is not likely that the old careless ways will soon return. Purchasing is definitely the front door to business and to healthy industrial relationships at a time of big and vital activity.

There will be some salesmen who resent this state of affairs, whose carefully cultivated back door contacts have suddenly lost their value. There will be some sales policies more intent on circumventing orderly purchase procedure than in selling. Such tactics have always done a disservice for the men and for their companies. Today more than ever, that attitude means lost business opportunities. It is also evidence of a fundamental lack of cooperation in our common national interest.

Stuart F. Heinritz

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is ready at RYERSON

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If you don't know Ryerson reliability, and if you're working on defense orders or other RUSH business, and you need steel, "Get in touch with Ryerson today!" We will do our full share, with a little extra besides, to back up American industry with the steel it needs and *must have* . . . promptly, efficiently and in the uniform quality so necessary to high speed mass production.

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Heat Treated Alloy Bars
Stainless Steel
Cold Finished Shafting
Strip Steel, Flat Wire
Mechanical Tubing
Boiler Tubes and Fittings
Welding Rod
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A TWO MILLION DOLLAR PROBLEM OF SALVAGE

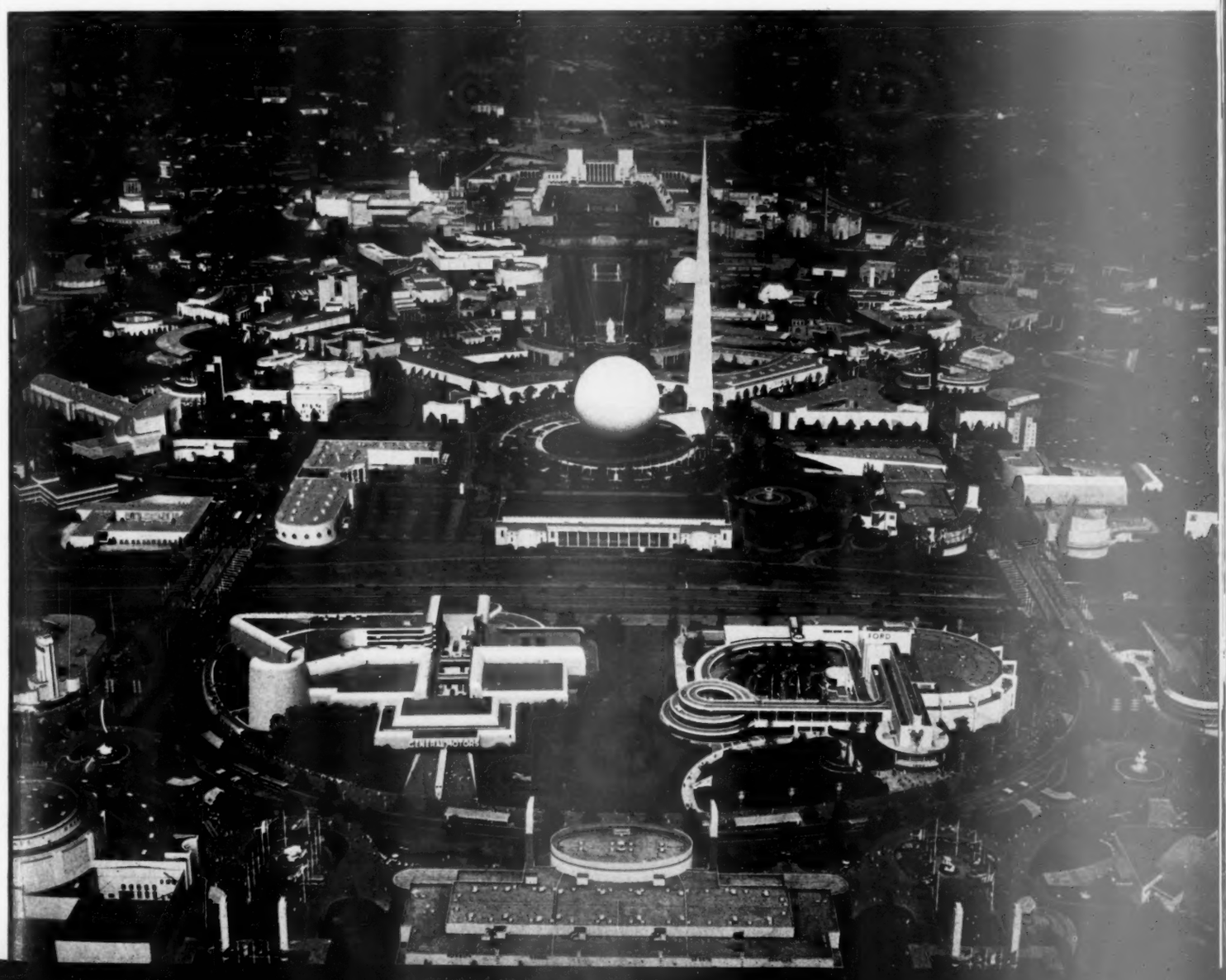
The millions of dollars' worth of buildings and equipment that today are the New York World's Fair, must be completely liquidated before March 1st.

By STUART F. HEINRITZ

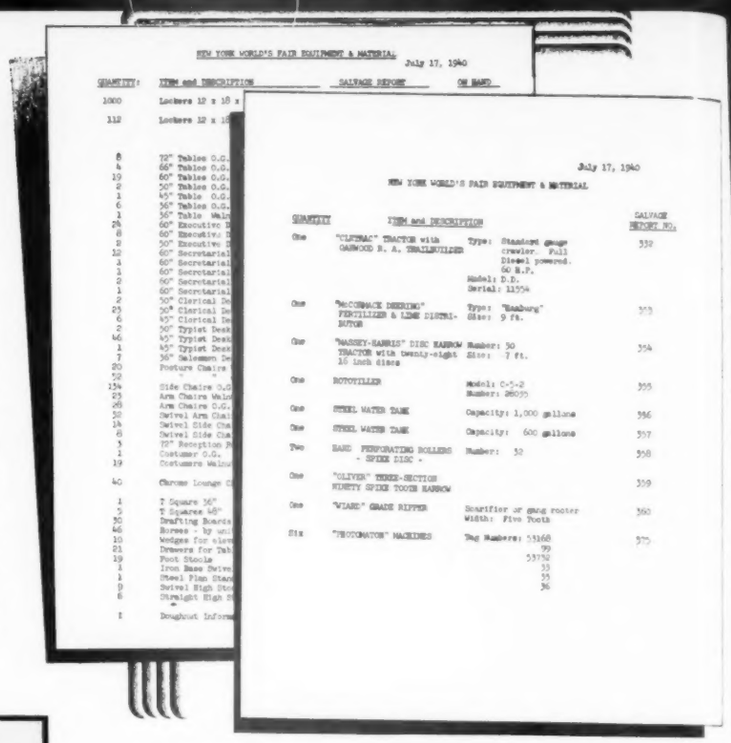
THE New York World's Fair of 1940 will close on October 27th. Within the short space of four months after that date, under the terms of its contract with the city, the whole superb "World of Tomorrow" which was reared on the Flushing meadows, and which has entertained, instructed, and enriched the lives of millions of visitors during the past two summers, must be reduced to the status of a "World of Yesterday," living only in memory. The buildings must be demolished, the equipment disposed of, and the land turned back to the city.

As in the case of most business organizations, the disposal of salvage and surplus equipment is regarded as a function of the purchasing department, and the responsibility for this enormous task has been assigned to Richard W. Greve, Director of Purchase for the Fair. It differs from the ordinary salvage operation in industry by its magnitude, by the fact that it represents practically 100% liquidation, and by the rigid time requirement which abruptly follows a period of full activity, for it is likely that the closing day will be one of the busiest and most popular in the two-year history of the Fair. It will be a case of "business as usual" or more than usual, on one day, and the start of complete liquidation on the next.

Greve has signed purchase orders for more than ten and a half million dollars since he took office in May, 1936, at the very inception of the Fair, and three years



Specimen sheets listing material that is now available for sale.



NEW YORK WORLD'S FAIR EQUIPMENT & MATERIAL

July 17, 1940

QUANTITY	ITEM and DESCRIPTION	SALVAGE REPORT	ON HAND
1000	Lockers 12 x 18 x		
112	Lockers 12 x 18		
8	72" Tables O.G.		
4	66" Tables O.G.		
19	60" Tables O.G.		
2	50" Tables O.G.		
1	45" Table O.G.		
6	36" Tables O.G.		
1	36" Table Walr		
24	60" Executive D		
6	60" Executive D		
8	60" Executive D		
12	60" Secretarial		
1	60" Secretarial		
1	60" Secretarial		
2	60" Secretarial		
1	60" Secretarial		
2	60" Clerical De		
25	36" Clerical De		
6	45" Clerical De		
2	60" Typist Desk		
46	45" Typist Desk		
1	45" Typist Desk		
7	36" Salesmen De		
20	Posture Chairs		
50			
154	Side Chairs O.G.		
23	Arm Chairs Walr		
28	Arm Chairs O.G.		
30	Swivel Arm Chai		
14	Swivel Side Cha		
6	Swivel Side Cha		
1	72" Reception D		
1	Customer O.G.		
19	Customers Walnu		
40	Chrome Lounge C		
1	T Square 36"		
1	T Squares 48"		
30	Drafting Boards		
46	Horses - by unit		
10	Wedges for slop		
21	Drawers for Tab		
19	Foot Stools		
1	Iron Base Swive		
1	Steel Plan Stand		
9	Swivel High Sto		
8	Skylight High S		
1	Doughnut Inform		

July 17, 1940

NEW YORK WORLD'S FAIR EQUIPMENT & MATERIAL

QUANTITY	ITEM and DESCRIPTION		SALVAGE REPORT NO.
One	"LIFTMAC" TRACTOR with CARWOOD B. A. TRAILBUTLER	Type: Standard gauge crawler. Full Diesel powered. 60 H.P. Model: D.D. Serial: 11754	339
One	"McCORMACK DEERING" FERTILIZER & LIME DISTRIBUTOR	Type: "Easiberg" Size: 9 ft.	353
One	"MASSEY-HARRIS" DISC HARROW TRACTOR with twenty-eight 16 inch discs	Number: 30 Size: 7 ft.	354
One	ROTOTILLER	Model: C-5-2 Number: 26035	355
One	STEEL WATER TANK	Capacity: 1,000 gallons	356
One	STEEL WATER TANK	Capacity: 600 gallons	357
Two	HAND PERFORATING ROLLERS - SPIKE DISC -	Number: 32	358
One	"OLIVER" THREE-SECTION NINETY SPIKE TOOTH HARROW		359
One	"WIARD" GRADE RIPPER	Scarifier or gang rooter Width: Five Tooth	360
Six	"TROTOMATOR" MACHINES	Tag Numbers: 53160 99 53752 53 55 36	375

R. W. GREVE
Director of Purchase,
New York World's Fair

He's a salesman now

before the gates were thrown open to the public. A considerable portion of the material represented by this expenditure has of course been used up in the normal day-to-day operation of the Fair. Another important group of purchases come under special conditions, such as the fleet of garbage trucks and the fire protection equipment, which were bought to New York City specifications and turned over outright to the city in lieu of fees which the city's service departments are not permitted to accept. Some of the structural purchases will necessarily be destroyed in the general process of demolition. But with all these exceptions, it is estimated that there will be approximately 20,000 individual items, with a value of about two million dollars, to be disposed of when the Fair closes.

Far-Sighted Purchasing

The task will be appreciably lightened by the fact that Mr. Greve foresaw this condition when he first started buying. In an article published more than a year before the Fair opened (PURCHASING, January, 1938) it was pointed out that many items, including electrical equipment, furniture, lockers and scaffolding, pumps, revolvers, concrete duct, office machines, etc., were bought with a repurchase agreement whereby the suppliers set a predetermined liquidation value, depending on length of use. Though ordinary depreciation schedules were impossible in a temporary enterprise such as this, the plan in effect assured an outlet for the equipment after it was no longer needed, and approximated a rental rate as the ultimate cost. The arrangement was welcomed by suppliers to avoid dumping large quantities of used equipment on the open market at one time and at distress prices. At the same time it was advantageous to the Fair, which is now relieved of the necessity of making sacrifice sales and realizing an excessively low return.

As a matter of fact, these repurchase agreements will not be invoked in every case, for there have already been a number of instances where more favorable arrangements could be made through other channels. They have, however, been a most salutary stabilizing influence. One thing is certain. At the wind-up, there will be a minimum of disposal through auction or public sale, a process which notoriously lends itself to collusive bidding and the sacrifice of values.

Another principle which is now proving itself is Mr. Greve's policy of gradual changes in staff and

Specimen sheets listing material that will be available when the Fair closes.

NEW YORK WORLD'S FAIR 1940, INC.

JULY 17, 1940

ADDING MACHINES

Burroughs - Electric:

1	Model 9-10-53	
1	" 9-	
1	" 9-	
12	" 9-10-95	
4	" "	
1	" "	

Allen - Wales - Electric

1	Model 11-E With Stand	
1	" "	
1	" " 12" Carri	
1	" "	
2	" "	

Allen - Wales - Manu

1	Model 10	
1	" 9	

Underwood - Electric

1	Model 10140-P with st	
1	" "	#9016
1	" 10120-P	#5144
1	" "	#5144
1	" 6120-P	#5267
24	" 6105-P	(5268 (2543 (5304 (5304
4	" 10120-P	#5301
1	" "	#5301
1	" 6105-P	#5300
1	" 10120-P	

Underwood, Hand-Operate

1	Model 6120	
1	" 6105	#5166

JULY 17, 1940
Page 2

OFFICE EQUIPMENT

MISCELLANEOUS EQUIPMENT (Continued)	Bought	P.O.N.J. Tag No.
A. B. Dick Company		
1 Mimeograph, Model 80, hand operated with stand, 17x22"	Oct. 36	35117
1 Mimeograph Duplicator No. 90 - Serial 6540	July 39	35371
1 Mimeograph - Model 100	July 39	35198
Addressograph Multigraph Company		
1 Addressograph, Model 1700	Jan. 37	35120
1 Addressograph, Model 1700	Feb. 37	35130
1 Addressograph, Model 2700, Electric, Serial 286753	Mar. 39	35370
1 Graphotype Machine - Electric - Model 6581	Mar. 39	35273
2 Graphotype Machines, Model 6581	Jan. 37	35135
1 Multilith Machine - Model 1277 - Serial 272626	Sept.39	35377
	Aug. 38	35023
Rotaprint Company		
1 Rotaprint Machine, Model R-30	June 38	35213
Ditto, Incorporated		
1 Ditto Duplicator Machine, Model 1A-F-5	Jan. 37	35115
1 Ditto Machine, Portable, Type E-3	July 39	35370
1 Ditto Machine, E-10, Electric	Apr. 38	35190
Elliott Addressing Machine Company		
1 Addressing Machine (Elliott) 21" Model 300	Jan. 37	35152
1 Addressing Machine (Elliott)	June 38	35021
Chandler Sales & Service Company		
2 Samweyer No. 6 Tying Machines	Feb. 38	35356 35182
Miscellaneous Items		
1 Mailing Machine, National Postage Meter, Model 80 Automatic	Mar. 30	35269
1 Mailing Machine, Postage Meter Co., Model JA	Jan. 37	35134
1 Letter Opener, "Lightning - 6-5"	Sept.36	35155
1 Hand Numbering Machine, Dates, 5 Wheel, Model K	July 38	35202
2 Hand Numbering Machines, Dates, 6 Wheel, Model 98	May 38	35210
	Aug. 38	35224
1 Duphoto Reproducing Machine 22" x 24" Magna	Sept.38	35229
1 Check Protector, "PAT" 6C-805	Jan. 39	35255
1 Check Protector, "PAT" Key Button - Electric	June 39	35350
1 Check Perforator - Cummins #39 Model 70E	June 39	35206
1 Check Signing Machine (Cummins) Model C- Electric	Nov. 37	35150
1 Bookkeeping Machine (National Cash Register Company) Serial 3-11951,Model 1-30410 (11-38) 12"-009-30-007	Apr. 37	35137
1 Payroll Accounting Machine (Burroughs) Model 26-17-00 Serial 26423315	Feb. 37	35121

procedure, keyed to the successive phases of the enterprise. There have been several distinct periods since the work started a little more than four years ago—the period of administrative planning and organization, the period of construction and development, the period of operation and maintenance requirements, and now the period of liquidation. Each of these phases has had a particular set of purchase requirements, but there has been no abrupt change in the department at any time. Instead there has been a tapering process, always looking ahead to the next development and preparing to handle it in the most efficient way on the basis of what has gone before.

This policy has been true regarding the release of materials as well as in their procurement. With three busy months of Fair operation ahead, involving a full and active maintenance program, the plans and the organization for liquidation of materials are well advanced, the department is geared to the new problem, and the work has, in fact, already started.

The Salvage Board

The broad problem of liquidation and salvage involves three general classifications:

(1) Liquidation of buildings as a whole, including or excluding installed equipment.

(2) Liquidation of movable and uninstalled property or equipment.

(3) Supervision of similar operations conducted by participants in the Fair (as distinguished from Fair-owned property), particularly in respect to permitting material to leave the grounds.

Central authority for the program is exercized by a Salvage Board, consisting of the Director of Purchase, a representative of the Finance Department, a representative of the Quartermaster Department, and a representative of the Property Control Section of the Accounting Department, who also serves as secretary of the Board. The function of the purchasing officer in this set-up is a vital one, for it is his responsibility to make the recommendation as to the manner of disposal, and also to carry it out. The function of the Board is to establish general policies, and to review and confirm actions taken under these policies.

Purchasing in Reverse

To accomplish the present purpose, the purchasing department retains its essential organization and its division of responsibilities, except that in the disposition of materials the actual procedure is of course the reverse of normal procurement. That is to say, a "Salvage Request" is received instead of a purchase requisition. The matter is referred to the particular buyer of that class of material — in most cases the same buyer who originally purchased the item, for turnover in this department has been exceedingly light. For example, J. F. Kenny, who bought all the electrical supplies and equipment, is now engaged in finding an outlet for that which has served its purpose. Miss Mildred R. Caparell, buyer of office supplies, is now engaged in disposing of surplus furniture and office machines. And so on, down the line.

Instead of seeking sources of supply, these buyers are now sounding out the market and seeking prospective users of the material, much of which is rather special in nature. Schools and colleges are being contacted as possible customers for portable bleacher sections; park departments, fraternal organizations, bands, and military schools as users of uniforms; etc. Negotiations are conducted with a view to securing the best possible return consistent with the customer's ability and desire to use the equipment. Wherever practicable, the policy of competitive bidding is encouraged, just as in the process of buying, for the Fair is operated as a quasi-public agency and has a responsibility for showing that every effort has been made to conserve its assets and funds.

Instead of arranging for convenient warehouse space, the problem now is to expedite the removal of materials, and arrangements have been made with the city for the opening of a new dump close to the Fair grounds, where the debris resulting from demolition of buildings can be disposed of with a minimum haul.

The Salvage Request is routed like any other purchase department form to secure the necessary authorizations with the least delay, to advise all interested departments, and to expedite the routine of disposal. It is a six-part form, each copy identified by a special color. The issuing department retains the sixth (green) copy as its own record. The other five are passed along to the Property Section of the Accounting Department, where the previous accounting record ap-

These lots of uniforms are typical of the equipment now being liquidated.

REQUEST FOR DISPOSITION OF MATERIAL
BY CONDEMNATION OR SALVAGE
Date
QUANTITY | UNITS | DESCRIPTION - REASON FOR REQUEST AND COMMENTS
Location of Material
REQUESTING DEPARTMENT
REQUEST INITIATED BY:
REQUEST APPROVED BY:
Department Head
ACCOUNTING DEPARTMENT Date
Previous Accounting Record
PREPARED BY
APPROVED BY:
Supervisor of Property Control
PURCHASE DEPARTMENT Date
Recommendations as to Disposal
PREPARED BY
APPROVED BY:
Director of Purchase
DISPOSITION AUTHORIZED
If original cost is under $000, Disposition may be authorized by the Director of Purchase and the Comptroller.
If original cost is over $000, Disposition must also be authorized by the Chairman of the Board.
Director of Purchase
Chairman of Board
Comptroller
Action approved at meeting held
Secretary of Board
RECORD OF DISPOSITION
The above described material has been disposed of as follows: Date
TO
DISPOSITION
FINAL ACCOUNTING RECORD
Debit
Credit
PROPERTY ACCOUNTING
AUDITED
NOTICE: ORIGINAL (White) - To Prop. Sect. - To Purch. Dept. - To Comptroller - To Stores Sect. - To Prop. Sect. DUPLICATE (Pink) - To Purch. Dept. - To Comptroller - To Purch. Dept. - To Stores Sect. - To Audit. TRIPLICATE (Blue) - To Prop. Sect. - To Purch. Dept. - To Comptroller - To Purch. Dept. QUADRUPLICATE (Buff) - To Prop. Sect. - To Purch. Dept. - To Comptroller - To Purch. Dept. QUINTUPLICATE (Salmon) - To Prop. Sect. QUINTUPLICATE (Green) - Retained by issuing Department.

plying to this particular item is inserted. The fifth (salmon) copy is retained here, and the other four are forwarded to the Purchase Department, where recommendations are prepared as to the best method of disposal. Approved by the Director of Purchase, all four copies are sent to the Comptroller for authorization of the disposition as recommended. This part of the procedure has been streamlined now that liquidation is of first importance, and only one signature in addition to that of the Purchase Director is required.

The Comptroller returns the fourth copy (buff) to the Purchase Department as authorization to go ahead with the disposition as planned. The other three copies go to the Stores Department, where the second (pink) copy is retained as a record, the original (white) is returned to the Property Section for a record of the final disposition, and the triplicate (blue) is sent to the Auditing Department for the final accounting record.

Liquidation Has Begun

To accelerate the process of liquidation, the Purchase Department has compiled lists of the material ready for immediate disposition, and adds to these lists from day to day as additional items are reported on the Salvage Requests as ready for release. In mimeographed form, and classified according to general classifications of related materials, these lists have been sent to selected lists of prospective buyers along with a letter outlining the conditions of sale, which, in brief, are that the material is offered "as is," "where is," and "if is" to eliminate any later claims arising from the availability and condition of the material; all sales to be final and on a net cash basis; all taxes and expenses incident to handling and removal to be for the account of the buyer; labor and trucking equipment used on the Fair site to conform with all labor agreements in force with the New York World's Fair 1940, Inc.; and delivery to be taken within five days of notification from the Purchase Department.

Approximately $100,000 worth of material and equipment have already been made available through

The technique of disposition is as clearly defined as the technique of procurement.

such lists, and a very considerable portion has already been sold.

Looking further ahead, a complete catalog or inventory is now in process of compilation, listing all items of property which are not now available but which will be offered subsequent to October 27th. Recent visitors to the Business Systems Building, where the "World's Fair Offices at Work" exhibit is located, have seen this inventory in process of compilation, being transferred from the IBM punch card record maintained by the Property Control Division. This record is completely itemized, each individual piece of equipment identified with the tag number attached to the piece itself, and showing the date of purchase and original cost.

This list is also being prepared in mimeographed form for circulation among prospective customers. The chief difference is that the tag number is used for identification in place of the Salvage Request number, since no formal request for disposition has yet been made by the various departments. The covering letter points out that these items will be available for sale subsequent to October 27th, and that bids are now being received. If bids are accepted, deposits are required on a sliding scale according to the amount of sale, and items are held for the account of the buyer. The other conditions of sale are similar to those previously cited, including the requirement that delivery shall be taken within five days after the Purchase Department advises the buyer that the material is available. Thus it is planned that the surplus will start moving out of the Fair grounds within a few days after the gates are closed to the public, clearing the way for the process of demolition which must be promptly undertaken.

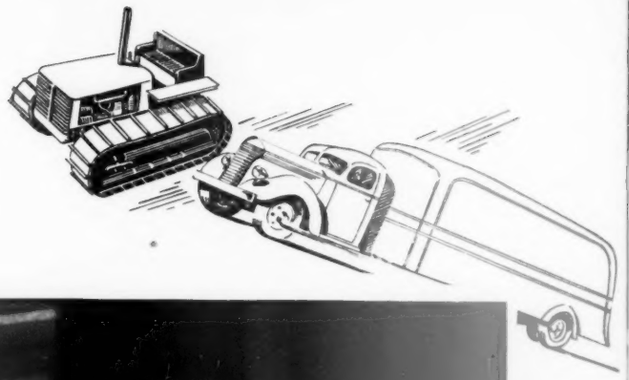
Policies

Naturally, the objective of any salvage program is to realize as much as possible from the sale of the surplus material. Being handled by practical buyers, it is likewise recognized that to move the material—and this is an urgent consideration in the present case—the controlling factors will be demand, and good value to the buyers. Consequently, except in the cases where repurchase agreements have been made, there are no preconceptions or rigid standards as to the return which is to be realized. It has already been demonstrated that this will vary over a wide range. It may average somewhat over 50% of original cost. There have been instances already where the return is better than 90%, and some where 15% is regarded as a very satisfactory deal. Obviously there are few prospective buyers who will be able to use specialized searchlight units and elaborate pyrotechnical equipment. On the other hand there will be many who could advantageously follow the example of the Borough of Queens, which has made arrangements to equip its new municipal building largely with furniture from the Fair offices.

The largest problem will be to make contact with the logical customers. Specialized lists are now being prepared of those who might be interested in contractors' equipment, construction and landscaping equipment, restaurant and cafeteria equipment, park benches and stanchions, automobiles and trucks, and

Continued on page 84

HOW INTERNATIONAL HARVESTER BUYS



By HARTLEY W. BARCLAY

IN the operation of the International Harvester Company, which manufactures a wide variety of products, many of them unrelated in the type of materials and supplies used, purchasing is a major responsibility of management. As the company's line of products has increased, all of them stemming from the farmer's and other customers' changing demands, the organization for the purchase of materials and supplies has had to keep abreast of a rapidly expanding business.

Materials are purchased for the production of from 60 to 70 basic products. The company manufactures a full line of motor trucks, wheel and crawler type tractors, farm implements of a great many types, and binder twine. It also operates a steel mill, ore mines and coal mines, and owns and operates sisal fibre plantations. Its purchasing is complicated by the fact that almost all of the company's products are capable of practically infinite variations to meet requirements of customers and the differing local conditions where the products are used. The number of the company's products, allowing for these variations, runs into the thousands. Its repair parts catalog lists more than 250,000 items.

Upwards of 2,000 different classifications of materials are purchased in the operation of the company's purchasing department. An average of 75 to 100 salesmen are interviewed daily. In the neighborhood of 20,000 sales calls are made upon the company annually.

Naturally, in the operation of such a widely diversified business, procuring materials for more than 20 manufacturing works and auxiliary operations in the United States, and for more than 100 sales branches and service stations, the purchasing department of the company buys a wide variety of supplies.

John Morrow, Jr., Vice President in charge of Purchasing, traffic and sisal fibre.

R. M. McCulloch, Manager, Purchasing Department.

FORTY MOST IMPORTANT MATERIALS PURCHASED BY INTERNATIONAL HARVESTER COMPANY

Abrasives

Alloys
- Ferro

Automotive Parts
Units and parts for tractors and motor trucks, such as:
- Axles
- Ignition equipment
- Windshields
- Rims
- Wheels
- Frames
- Glass
- Cabs—Special
- Bodies
- Springs
- Brakes
- Transmissions
- Batteries
- Radiators
- Carburetors
- Clutches

Bearings
- Ball
- Roller
- Lined

Brick
- Refractory
- Building

Building Materials
- Sand
- Cement
- Asbestos
- Insulation
- Glass
- Brisk
- Fabricated steel

Building Contracts
- Manufacturing plants
- Raw materials properties
- Branch houses
- Service stations
- Etc.

Burlap

Castings
- Iron
- Malleable
- Steel
- Aluminum
- Die
- Brass

Chain
- Coil
- Lock
- Malleable
- Silent
- Grip

Chemicals

Coal

Coke

Copper and Brass
- Sheets
- Strip
- Tubing
- Fabricated
- Etc.

Cotton Fabrics

Electrical Equipment
- Motors
- Generators, etc.

Forgings
- Steel
- Brass

Hardware
- Automotive

Iron, Pig
- Foundry
- Malleable

Leather

Locomotives

Lumber
- Rough
- Finished
- Pattern

Machine Products
- Screw machine parts

Machine Tools
- General plant machinery and equipment
- Conveyors
- Boiler house and power plant equipment
- Mining machinery
- Steel mill equipment

Office Supplies
- Stationery
- Printing
- Etc.

Paint Pigments

Paper and Paper Products

Petroleum Products

Pipe
- Steel
- Cast iron
- Fitting
- Valves
- Etc.

Rubber Goods
- Mechanical

Supplies
- General
- Hospital
- Surgical
- Laboratory and scientific instruments
- Railroad
- Electrical
- Foundry

Scrap
- Heavy melting
- Steel
- Cast Iron

Sisal
- Fibre

Stampings
- Steel

Steel
- Rolled products
- Bars
- Shapes
- Sheet
- Strip
- Alloys
- Plates
- Stainless
- Tool, etc.

Tires—Rubber
- Motor truck
- Tractor
- Implement

Tools—Small
- Cutters
- Drills
- Reamers
- Dies
- Jigs
- Fixtures

Tubing
- Steel, seamless
- Cooper
- Brass

Upholstery Materials
- Automotive

Varnish
- Synthetic
- Finishes

Organization of Department

Purchasing functions of the International Harvester Company are centralized in the purchasing department, located at the general offices at 180 North Michigan Avenue, Chicago. The degree of centralization is perhaps greater than in most companies, as practically all of the procurement is done through the general office. This degree of centralization has proved to be most effective in the company's buying, although, as will later be shown, there is the closest cooperation between the central purchasing office and the storekeepers at the various works, who come under the manufacturing department.

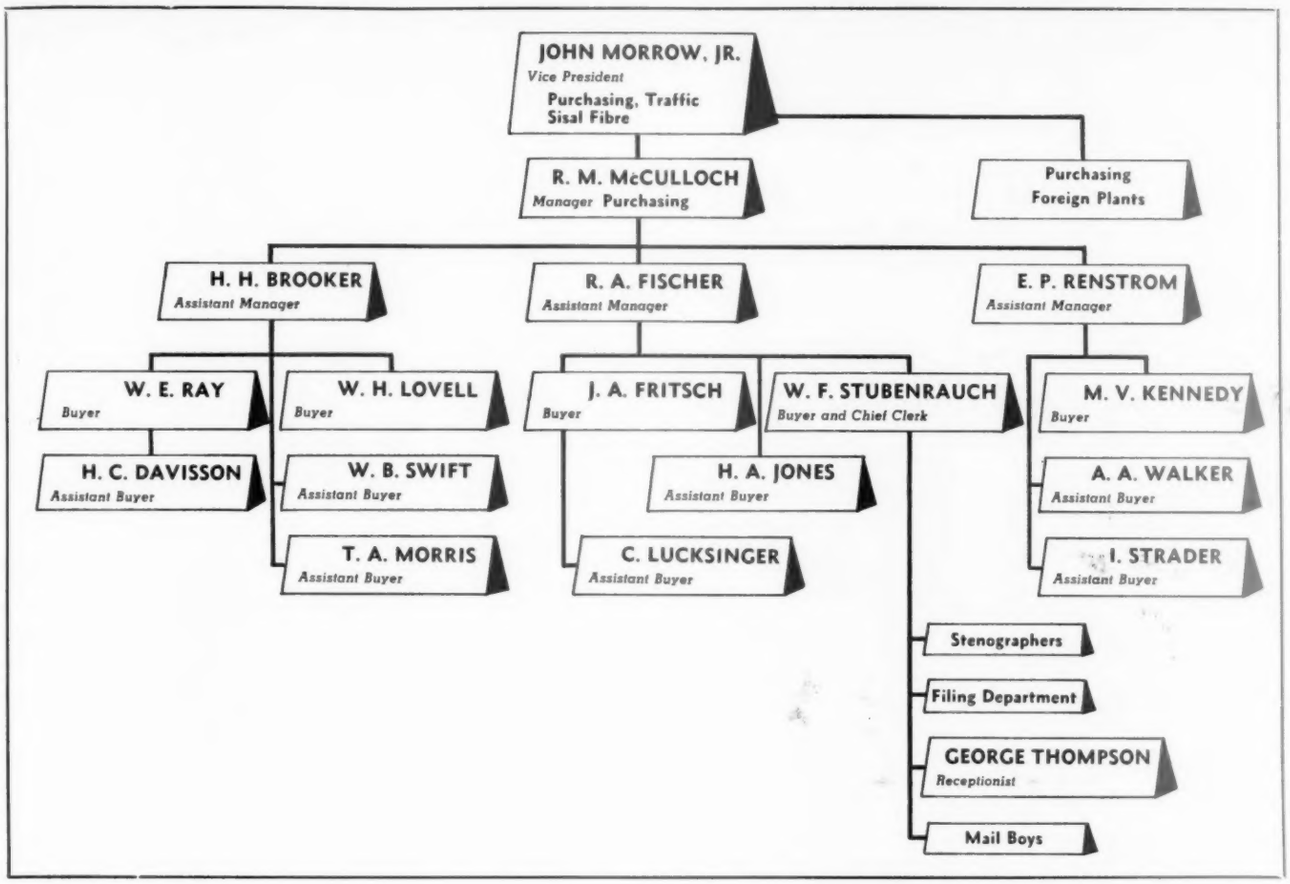
John Morrow, Jr., vice president of the company, is the executive officer in charge of purchasing. He also has charge of the traffic department and has supervision of the company's sisal operations. Sisal is an important factor in the company's operations because it is the chief raw material used in the manufacture of binder twine.

Mr. Morrow has charge of all the company's purchasing in the United States, and likewise purchasing for the company's foreign manufacturing operations. An entirely separate organization is maintained for foreign purchasing, however, in the foreign areas where manufacturing is carried on.

Reporting direct to Mr. Morrow is R. M. McCulloch, manager of the purchasing department.

Three assistant managers, H. H. Brooker, R. A. Fischer, and E. P. Renstrom, report to Mr. McCulloch. Each assistant is in charge of a group of buyers and assistant buyers, and each more or less specializes in a group of materials.

There are five buyers in the department, J. A. Fritsch, Miss Mae V. Kennedy, W. H. Lovell, W. E. Ray and W. F. Stubenrauch. In addition to his duties as buyer, Mr. Stubenrauch acts as chief clerk.



Seven assistant buyers comprise the remainder of the buying personnel of the department, H. C. Davisson, W. B. Swift, T. A. Morris, C. Lucksinger, H. A. Jones, A. A. Walker and I. Strader. Some of these assistant buyers work directly with the buyers, while others report directly to one of the assistant managers.

The accompanying chart shows in graphic form the organization of the department. In the main, it is organized for simplicity of responsibility. The line of responsibility is clear and direct, with little or no overlapping of duties. Within the department itself Mr. McCulloch is in complete charge. In matters of sufficient importance to require top executive consideration and decision, Vice President Morrow furnishes liaison with that group and in turn has direct contact with the executive management of the company.

Insofar as supervision is concerned, the company's purchasing department functions independently of the operating departments. Naturally, however, it has the very closest cooperation with all other departments, particularly with manufacturing, engineering and sales.

Personnel Policies

It has been a long standing policy of the International Harvester Company to train its own personnel, and as this policy affects the purchasing department it naturally follows that this department, with the exception of new recruits or younger men being taken in from the outside, is composed of men who have had considerable service with the company and who in their training have gained an extensive experience in the purchasing field.

There are several sources within the organization from which men of experience can be drawn by the purchasing department when the necessity arises. It is natural that the main potential source should be the factories, in order to obtain men with some knowledge of operating problems or contact with uses to which materials are put in the manufacture of the company's products, as well as the problems confronting the factory organization in the flow of production through a plant. The department also has learned from experience that a well-trained commercial mind is an important qualification.

It is not considered absolutely necessary by the company that purchasing department men have either a full manufacturing or a full engineering experience. Practical knowledge in these branches is essential, but it has been found that after a very few years in the purchasing department its buyers have gained wide

Heavy duty International motor truck with trailers **School bus** **Delivery truck**

MC CORMICK WORKS
RICHMOND WORKS
WEST PULLMAN WORKS
WISCONSIN STEEL WORKS
FORT WAYNE WORKS
MILWAUKEE WORKS
EAST MOLINE WORKS
SPRINGFIELD WORKS
CANTON WORKS
TRACTOR WORKS
INDIANAPOLIS WORKS
FARMALL WORKS
AUBURN WORKS

knowledge of production and engineering practices and techniques. Where their knowledge in some specific problem is not sufficient, they always have access to the manufacturing or engineering executives best versed in the particular problem. The younger men who are taken in from the outside from time to time are encouraged to take special educational courses.

While it is the practice to assign certain broad classifications of materials to assistant managers, buyers and assistant buyers, it is the aim to have every man in the department sufficiently trained by experience to buy any material the company requires, should the need arise. While buyers do handle certain materials, specialization as between different groups of materials is not over-emphasized. The specialization is well diversified. Within the group of each assistant manager may be found materials as unrelated as steel bars and surgical supplies.

Vice President Morrow began his service with the company in 1902 as an office boy at the Springfield, O., works. In 1907 he was transferred to the purchasing department as a clerk. In 1910 he was promoted to chief clerk of the department, and the next year was sent to Europe to help install a stores and purchasing department for the company's European factories. Following other European experience, he joined the American Expeditionary Force in France, and was attached to the General Purchasing Board.

In 1919, following the war, he was placed in charge of all purchasing for the company's European plants, and later organized a traffic department for the same plants. In 1931 he returned to the United States, and several months later became manager of the purchasing department at Chicago. From that position he was advanced to vice president in 1935.

Purchasing Manager McCulloch also spent the greater part of his service with the company in its purchasing department. He began his service with the company in 1904 and has 36 years of service. His first job was in the order and schedule department in 1904. In 1909 he was transferred to the company's Hamilton, Ont., works in the purchasing department. In 1926 he returned to the Chicago general office as an assistant manager in the purchasing department.

Short biographical sketches of other members of the department are included elsewhere in this article.

It is essential in the purchasing department of such a company as the International Harvester Company, which handles so many diversified materials and supplies, to develop a versatile, well-rounded department personnel. A great deal of study is given to methods whereby thorough training and information may be given to the different men in the department. The objective is to train them so well that they may be moved about on different jobs when the occasion requires without the quality of the work suffering.

Office Layout

The purchasing department is located on the fifth floor of the Harvester Company's Chicago general offices. This is the lowest floor of the building used by the company. The purchasing department was located there for convenience and accessibility to salesmen. All members of the department are located on that floor except Mr. Morrow, who has his office in the executive department.

The manager, assistant managers and buyers are provided with private offices, the assistant buyers being located at individual desks in the general room in convenient position to the assistant manager or buyer to whom they are responsible.

The stenographic, filing and mailing departments are located in the rear section of the department.

Contracts and Methods of Ordering

The company follows the plan of fitting the method of purchasing to the commodity and the general market conditions—that is, either buying in the open market as required, making short or long term written contracts or agreements, or buying a given quantity for specific delivery. All contracts are made by the central purchasing department and the storekeepers at the works furnished with a copy. The storekeeper henceforth places his orders direct on the supplier against these contracts. However, copies of such orders placed by the storekeepers against contracts are sent daily to the central purchasing department for scrutiny.

In the case of two or more contracts for like commodities, storekeepers requisition such materials on the purchasing department, in order that the buyer may allocate quantities with the different suppliers.

Purchases made in the open market or for specific quantities and deliveries are made either on estimates furnished by the plants or on detail requisitions reaching the purchasing department through the medium of the storekeepers for quantities and deliveries either prearranged or to fit in with a given schedule of production at the plants.

Strictly speaking, the function of the purchasing department ceases when either a contract is made or a purchasing order is placed to cover either requisitions or estimates. In other words, the storekeepers at each of the plants assume the responsibility of seeing that the material arrives at the plant as required and usually the purchasing department intervenes only when it becomes necessary for the factory to call upon it for assistance in some emergency.

The manufacturing department of the Harvester Company is organized with collateral plants making parts for machines made in other plants. This involves a considerable quantity of interworks buying. All such interworks buying is handled directly by interworks orders placed by the storekeepers of the buying works with the works from which the materials are bought. No copies of these interworks orders are sent to the purchasing department, as the plant manufacturing a given collateral handles the ordering or requisitioning on the purchasing department of materials necessary to make the interworks order, thereby functioning as an originating works.

McCormick-Deering milk cooler

Small combine with pickup attachment

Hay loader pulled by tractor

Tractor-drawn rod weeder

1

4

5

6

7

THE PURCHASING STAFF

2

1 H. H. BROOKER, Asst. Mgr.— Educated elementary schools, Lockport, N. Y., business college; experience with number of manufacturing, railroad and oil concerns; chief clerk storekeeping department, New York Central R.R.; joined Harvester Company 1912 as stenographer, accounting department; assistant traveling auditor 1917; with Allied Purchasing Committee and War Industries Board during World War; 10 months with War Industries Board Commission in London and Paris after war; assistant to steel buyer in purchasing department, Harvester Company, January, 1920; appointed assistant manager, purchasing department, April 1, 1926; since 1923 buying paints and varnishes, coal and coke, electrical supplies, petroleum products, lumber, rubber tires.

2 E. P. RENSTROM, Asst. Mgr.— Educated elementary and high schools, Chicago, special courses in higher accounting and in foreign languages, Northwestern University; started with Harvester Company July 3, 1916; began in accounting department, then promoted to assistant general bookkeeper; transferred to purchasing department October, 1917, as record clerk checking lumber operations; shortly afterward began buying small tools and mill and factory supply items; supplemented purchasing experience with widespread accounting study, including railroad and packing house accounting, basic office procedure, general bookkeeping, credits and collections, etc.; appointed assistant manager, purchasing department July 1, 1937; now buying scrap iron and steel, scrap metals, pig iron, castings, forgings, truck and tractor wheels, frames and alloys such as Ferro Manganese, Ferro Silicon, Spiegeleisen, etc.

3 R. A. FISCHER, Asst. Mgr.—Started with Harvester Company March 1, 1923; 17 years of service with the company; entire experience with company spent in purchasing department; appointed assistant manager, purchasing department, July 1, 1937; specializes in buying steel bars, plates, shapes, sheets, strip, wire, automotive parts.

3

4 W. F. STUBENRAUCH, Buyer— Started with Harvester Company Sept. 5, 1905; 35 years of service with company; first job in storekeeping department, Deering Works; entered purchasing department as clerk; successively promoted through various jobs to present position as buyer and chief clerk of the department; specializes in buying windshields, clutches, shock absorbers, head lamps, truck bodies.

5 W. H. LOVELL, Buyer— Educated public schools, Ashley, Ill., later studying telegraphy; early experience as telegraph operator and in freight auditor's office, Illinois Central Railroad; began service with Harvester Company January 15, 1906; first job in traffic work in repairs department; handled motor truck repairs for repairs department, duties consisting of passing on size of stock orders; transferred to purchasing department Feb. 22, 1917; specializes in buying building materials, belting, rubber goods (mechanical and molded), cotton goods, refractories, fire brick, electrical supplies, insulating materials.

6 W. E. RAY, Buyer—Began business career as office boy with Deere & Company, Moline, Ill.; promoted through successive stages to file clerk, invoice clerk, to Assistant Purchasing Agent buying bolts, nuts, rivets, washers, etc.; one year spent in selling with Standard Oil Co. of Indiana; two years as yard superintendent and construction supply company; joined Moline Plow Company in purchasing department, eventually becoming assistant buyer; began service with Harvester Company as storekeeper at Farmall Works, Rock Island, Ill., April, 1926; spent nine years as storekeeper at this works; transferred to general offices in 1935 as buyer in purchasing department; now buying machinery, electrical equipment, and all goods of a capital nature, small tools such as drills, reamers, cutters, etc., and has responsibility for all types of construction contracts.

Cab-over-engine truck

Heavy duty dump truck

One bottom plow and tractor

Crawler tractor and plow

Three

7

8

9

10

11

7 MAE V. KENNEDY, Buyer— Specialized in secretarial and general business course, Barrett Institute, Chicago; began service with Harvester Company, August, 1918; employed in purchasing department throughout entire 22-year service period with company; began as stenographer; handled steel correspondence for 12 years and later began buying small tools; now specializes in buying batteries, air cleaners, carburetors, fuel pumps, filters, mufflers, high pressure lubricating equipment, hardware, cardboard trim and upholstery material.

8 J. A. FRITSCH, Buyer— Business college training; began service with Harvester Company, 1917; first job as general clerk in employment department, Deering Works; charge of works mailing department for two years; entered stores department in 1920; began purchasing certain materials for workers in 1921; entered purchasing department of company in 1923; first job there buying items used in Deering Works; now buying roller chain, screw machine parts, all types of screws, bolts and nuts, lock washers, pipe, steel tubing, formed tubular products, miscellaneous springs, motor valves, valve tappets, valve springs, piston rings, piston pins, moldings, instrument panels for trucks, speedometers, gauges.

9 C. R. LUCKSINGER, Asst. Buyer— Began service with Harvester Company December, 1929; first job as office boy in purchasing department; experience in obtaining prices and handling delivery of items; recording price information; now buying warehouse steel, wire cloth, wire rope, rails, malleable chain.

10 A. A. WALKER, Asst. Buyer—Special training in agricultural, business administration and art courses. Began with Harvester Company July, 1935; first job clerk in purchasing department; assisted in placing orders covering materials requisitioned by works, and assisting buyers in department; now buying some automotive parts, electrical equipment, paper containers, safety equipment.

11 H. A. JONES, Asst. Buyer—Received A.B. degree in commerce from School of Commerce, University of Wisconsin; started with Harvester Company 1934; began handling records on certain production items and assisting in buying; promoted to assistant buyer; now buying gaskets, die castings, welding rod and tips, ingot molds and stools, rolling mill rolls and railway supplies.

12 H. C. DAVISSON, Asst. Buyer—B.S. degree in commerce, Northwestern University; began with Harvester Company in 1936; experience in storekeeping department at Springfield and Farmall works; came into the purchasing department in 1937; began placing orders for small tools; later made assistant buyer; now specializing in buying small tools and mill supplies.

13 I. L. STRADER, JR., Asst. Buyer— Graduated in Metallurgical Engineering, University of Illinois; began with Harvester Company 1935 in purchasing department; first duties consisted in keeping records and helping buyers; promoted to assistant buyer; now buying nonferrous metals, ball and roller bearings, engine bearings, gears, steel stampings, spark plugs.

14 W. B. SWIFT, Asst. Buyer—A.B. degree, Tuck School of Business Administration and Finance, Dartmouth College; three years with life insurance company; assistant cashier, Illinois State Insurance Department, 1934; began service with company August, 1934; worked in storekeeping department at McCormick, West Pullman, Tractor and other works learning stores handling and procedure; two years spent grading lumber; entered purchasing department July, 1937; first job keeping records; now specializing in buying mill supply items, plumbing, heating equipment, etc.

15 T. A. MORRIS, JR., Asst. Buyer— B.S. degree in School of Commerce, Washington & Lee University; began service with the Harvester Company in 1935; entered purchasing department and spent some time in training work; now specializing in buying petroleum products, industrial chemicals, abrasives, felt goods, automotive service station equipment.

12

13

14

15

Three bottom tractor plow

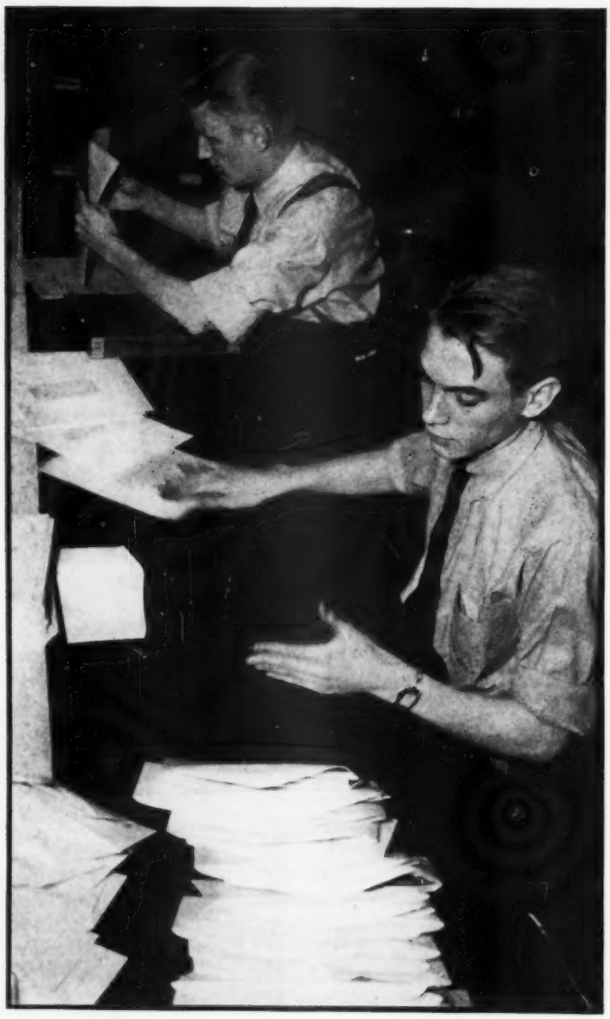
Grain drill pulled by tractor

One row corn picker

One row mounted corn picker

Purchasing Department reception room.

Mailing Department.



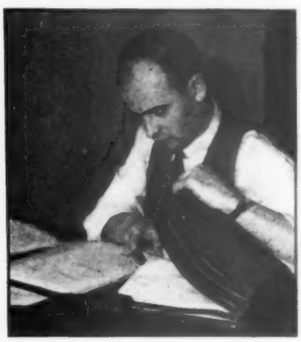
It may be well to note here that all detail records are kept by the storekeepers at the works and only records of quantity and price of materials ordered are kept in the purchasing department for ready reference.

Requisitions originating in the sales branches throughout the country go first to the order clerk in the central sales department office in the Chicago general office. He consolidates the various orders for similar supplies, keeps records of the requisitions, checks delivery and performance for the entire sales organization, much the same as a storekeeper performs at an individual works.

In addition to the storekeepers at each works, there is also a chief storekeeper in the general office whose duty it is to keep in close contact with the individual store keepers and others at the plants. It is of course natural that the purchasing department is at all times in close cooperation with the chief storekeeper.

In the further discussion of the operations of the purchasing department, the methods for handling the purchase of production items for the manufacturing works will be considered. In addition, however, the purchasing department handles the procurement of all miscellaneous factory supplies, small tools and maintenance items. These are purchased in substantially the same way as production items, being bought both against contracts and in the open market.

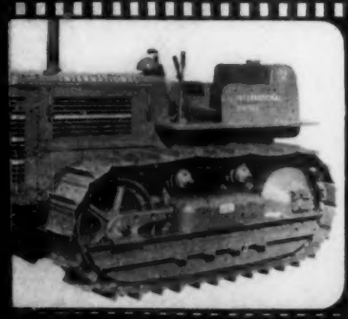
Mailing Department.



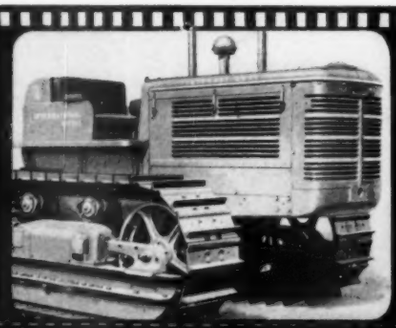
Specifications

Nearly all production material requisitions handled by the purchasing department carry detailed

Small Diesel crawler tractor



Largest Diesel crawler tractor



Tractor powered grain binder

Tractor mounted cultivator

Stenographic Department.

specifications. Specifications for all production materials are written by the Harvester engineering department. Specifications for tools and equipment are written at the various works by the plant engineering or tool designing departments under the supervision of the works superintendent. All purchases of plant equipment, machine tools, heavy-duty dies, fixtures and the like are made by the central purchasing department collaborating with the factory staff.

The purchasing department places all contracts for building construction and building improvements of every description, and in such instances collaborates with the construction engineering department which furnishes designs, plans and all specifications.

Blueprint specifications come to the purchasing department from various sources along with the requisitions. One copy of the blueprint specifications is filed in the purchasing department with the requisition for future reference. The other copies go out with the inquiries to suppliers.

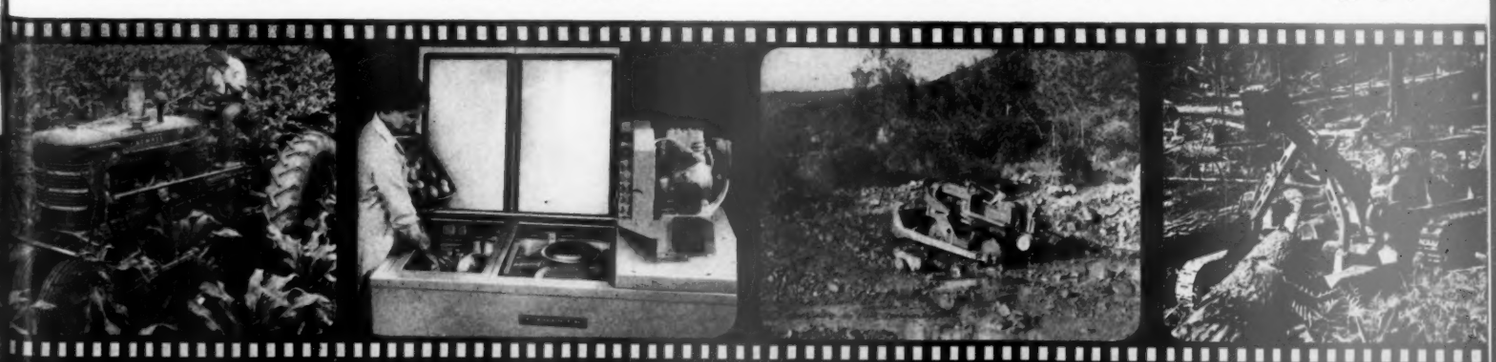
In the case of production items, it is the general policy of the purchasing department to follow the specifications sent in by the storekeepers of the works. But if, in the course of its inquiries, it develops competition that departs from or upsets a works engineering department specification, it is its perogative and duty to inform the proper engineering department executive of the possibilities of the alternate material.

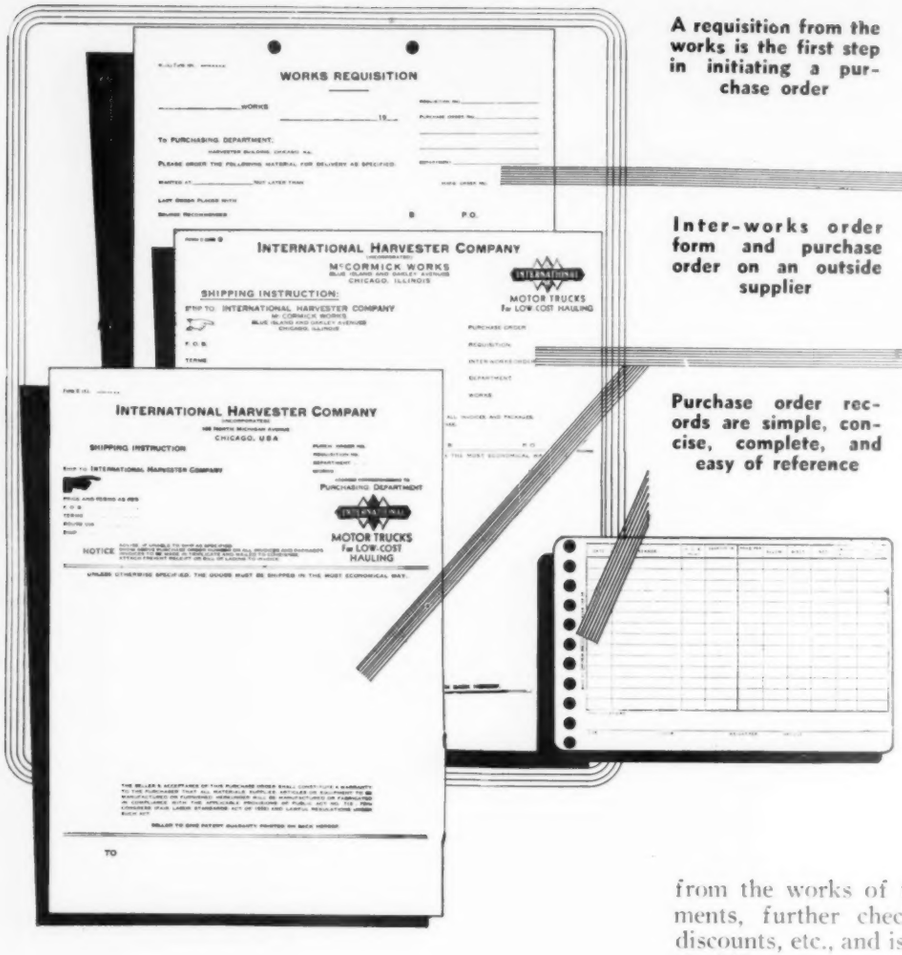
The alternate material is then freely discussed and debated and in the end a mutually satisfactory decision is arrived at.

Placing of Orders

After the requisition arrives in the purchasing department, the buyer sends out inquiries and develops competition for the business in the same way that com-

Tractor mounted corn cultivator | McCormick-Deering cooler | Crawler tractor in industrial use | Tractor in logging operation





A requisition from the works is the first step in initiating a purchase order

Inter-works order form and purchase order on an outside supplier

Purchase order records are simple, concise, complete, and easy of reference

petition is developed on contract purchases. After this has been done, and negotiations have been concluded, the buyer makes his decision and the order is issued.

The order is written in complete form, including information such as the f.o.b. point, prices, terms, time and place of delivery. It also indicates to the supplier whether the sale is subject to taxes and if so, which taxes. If the sale is not subject to taxation, a tax exemption certificate is attached for the benefit of the supplier. In all, the original and seven copies of all orders are written and distributed as follows:

1 copy to the traffic department for routing.

1 copy to the disbursing division of the accounting department.

3 copies for the receiving works.

1 copy for the purchasing department files.

1 copy (pink sheet) of all orders and correspondence is arranged together daily in a folder in groups, indicating all transactions of assistant managers and buyers. This is used for ready reference by anyone in the department, and is a check by the manager and the assistants on the activities of the department as a whole or in groups.

The original copy, of course is mailed to the vendor.

Checking of Orders

After the central purchasing department has placed order with a supplier, the storekeeper at the receiving works is responsible for following the order as regards delivery and checking receipt of the materials. The inspection department at the works has the responsibility for checking quality and other specifications. The responsibility for checking and approving the vendor's invoice for quantity, price, terms and payment rests upon the works accounting department, which receives one of three copies of the order sent to the works. The disbursing division of the accounting department in the general office, upon receipt from the works of the invoice and supporting documents, further checks price, terms, extension, cash discounts, etc., and is charged with the final payment of the bill.

Inasmuch as the accounting department checks the invoices both at the receiving works and in the disbursing division of the general office, and the storekeeping department at the works checks materials and deliveries, it is to be noted that the purchasing department, except to countersign vouchers indicating that the vendor is in good standing, has no responsibility either in the control of the quantity of materials received or the approval of price, terms and payment of the invoice.

Handling of Records

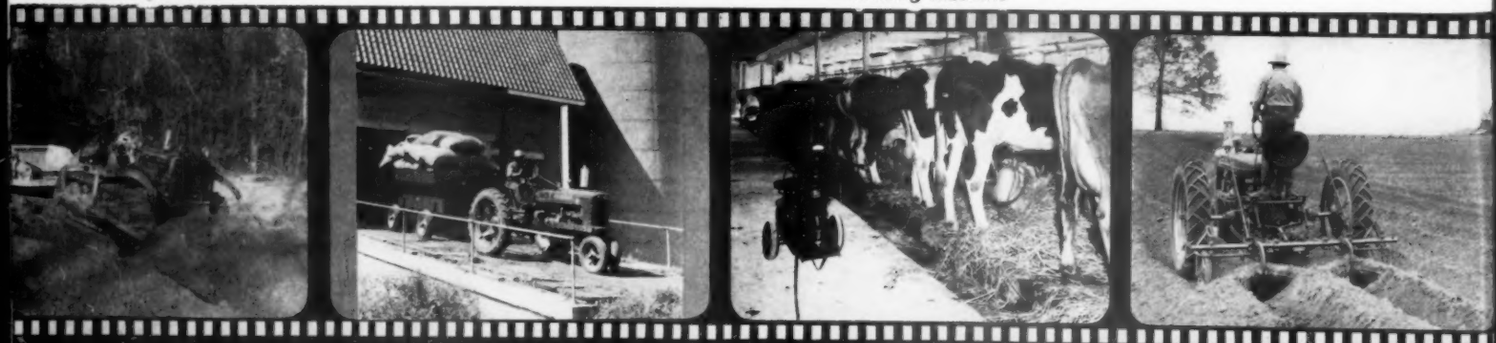
A standard short form filing system has been developed for handling records on screw machine parts and other parts and materials where thousands of individual items are bought and recorded. These forms are filed by a numerical system, based upon the last digit in the part or pattern number. This system has been found to be unusually advantageous in the case of parts where so many items have to be bought. It provides quick reference, requires small filing space,

Crawler tractor highway construction operation

Tractor drawn farm truck

McCormick-Deering portable milking machine

Tractor drawn lister



Tractor powered mower

Tractor drawn hay rack

Hay loader

Tractor powered hay chopper

affords a complete up-to-date record without consulting the works, and affords an immediate idea of yearly parts requirements.

The Harvester Company's purchasing department is not charged with direct responsibility of inventory control, this being under the jurisdiction of the manufacturing department.

Responsibility for the broader, more important policies of inventory control rests with the executive management, and Mr. Morrow participates in the decisions made from time to time regarding these policies. The chief storekeeper, who reports to the manufacturing division, is usually charged with the details of working out with the plant organization the inventory policy adopted.

Policies of Purchasing Department

The Harvester Company has a number of specific purchasing policies which have been followed for many years and which form a sort of unwritten framework for the operation of the department. The paramount consideration is the purchase of quality materials. This has always been the foundation of the company's purchasing policy. It has prided itself on quality products and quality products cannot be built without the use of high quality materials.

It has been stated before that the company follows the plan of fitting the method of purchasing to the commodity and general market conditions, and as observation of commodity prices over the past many years indicates a gradual downward trend of so many of the materials and units which this company buys, due to the progress of technology and related factors, it is the endeavor of the purchasing department to maintain as great an amount of flexibility within the department as is consistent and to thus be in position to take advantage of commodity price movements.

This policy seems the one best calculated also to keep the minds of the buyers and others in the organization more alert to price trends and general conditions related to responsibility for price trends. This policy of flexibility oftentimes can be used to mutual advantage of both buyer and seller.

It is the department's policy to encourage development of better methods of production, which will help also the company's cost and at the same time help the supplier. The purchasing department has an enviable background of helpful cooperation in this way with many suppliers who have found that as a result of mutual helpfulness, their products have been improved to the point that their markets have been widened.

Standardization

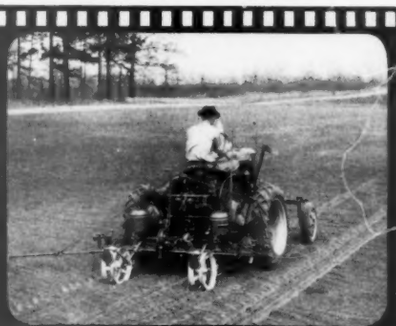
Materials purchased wherever possible are made to fit the greatest number of machines and models, and toward that end a representative of the purchasing department sits on the company's committee on materials and parts standards. This standardization group and its work is of tremendous importance in such a varied and widespread industry. Large economies are possible, and the purchasing department has a very direct interest in cooperating to the fullest extent to achieve maximum results.

International Harvester stockrooms are modern and efficient in layout and equipment, engineered to provide the utmost in compactness, accessibility, and good lighting.

Tractor drawn peg tooth harrow

Tractor drawn disk harrow

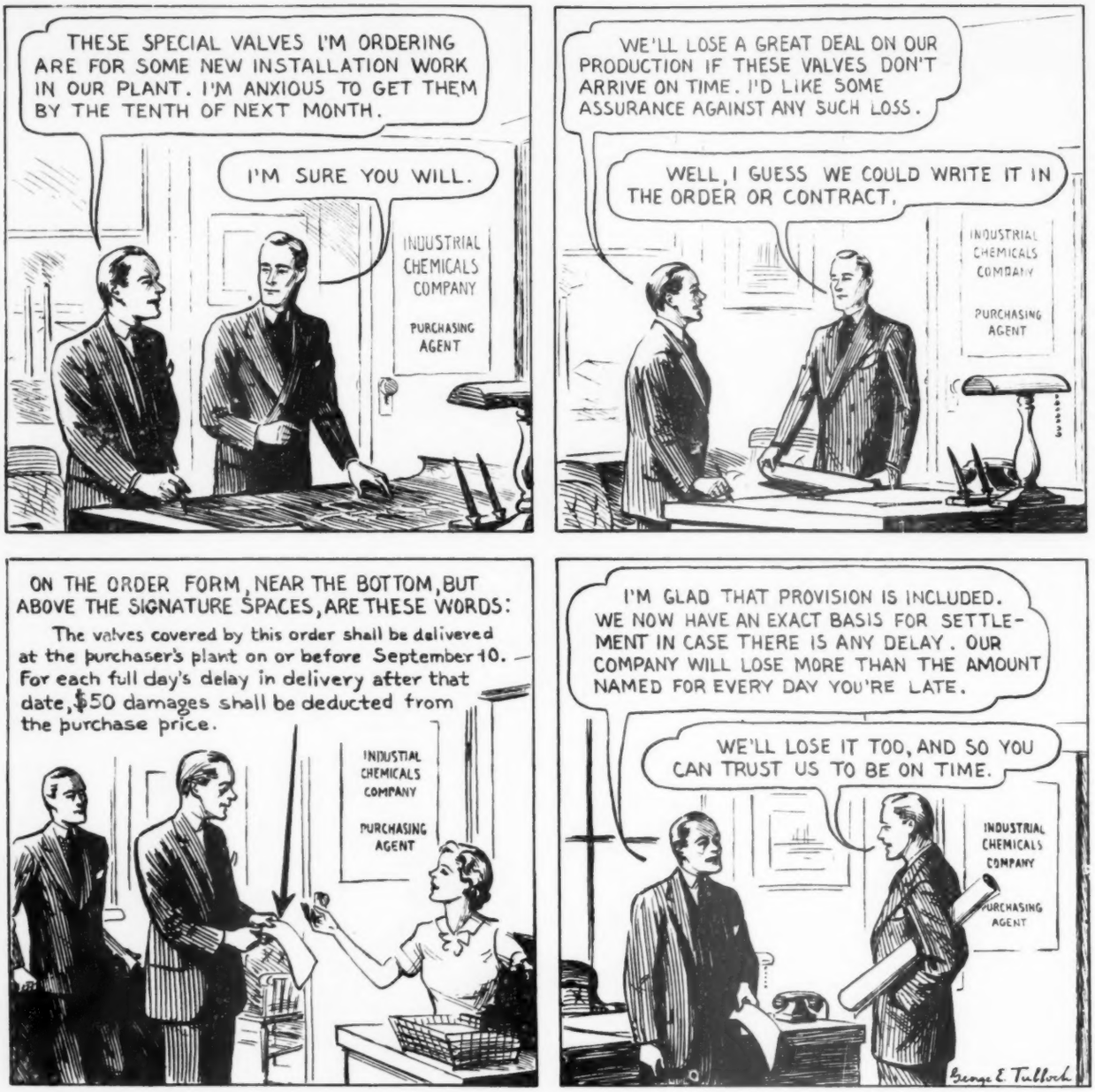
Tractor drawn corn planter



Tractor cultivator

PEN-POINTS ON PURCHASE LAW

BY H. H. SHIVELY, BABSON INSTITUTE


THESE SPECIAL VALVES I'M ORDERING ARE FOR SOME NEW INSTALLATION WORK IN OUR PLANT. I'M ANXIOUS TO GET THEM BY THE TENTH OF NEXT MONTH.
I'M SURE YOU WILL.
INDUSTRIAL CHEMICALS COMPANY
PURCHASING AGENT
WE'LL LOSE A GREAT DEAL ON OUR PRODUCTION IF THESE VALVES DON'T ARRIVE ON TIME. I'D LIKE SOME ASSURANCE AGAINST ANY SUCH LOSS.
WELL, I GUESS WE COULD WRITE IT IN THE ORDER OR CONTRACT.
INDUSTRIAL CHEMICALS COMPANY
PURCHASING AGENT
ON THE ORDER FORM, NEAR THE BOTTOM, BUT ABOVE THE SIGNATURE SPACES, ARE THESE WORDS:
The valves covered by this order shall be delivered at the purchaser's plant on or before September 10. For each full day's delay in delivery after that date, $50 damages shall be deducted from the purchase price.
INDUSTRIAL CHEMICALS COMPANY
PURCHASING AGENT
I'M GLAD THAT PROVISION IS INCLUDED. WE NOW HAVE AN EXACT BASIS FOR SETTLEMENT IN CASE THERE IS ANY DELAY. OUR COMPANY WILL LOSE MORE THAN THE AMOUNT NAMED FOR EVERY DAY YOU'RE LATE.
WE'LL LOSE IT TOO, AND SO YOU CAN TRUST US TO BE ON TIME.
INDUSTRIAL CHEMICALS COMPANY
PURCHASING AGENT
George E. Tulloch

20: Damages Payable for Non-Performance of a Purchase Contract

PROVISIONS such as the one illustrated above are common in business contracts. The one here shown binds the seller to pay a named sum as damages in case he fails to perform at the time agreed. In the law these damages are known as liquidated damages. What they shall be in case of breach is settled between the parties when the contract is made. Thus they try to make certain that faulty performance by the obligated party does not lead to a lengthy dispute and possibly costly litigation.

In case there is a suit, the court normally accepts the sum agreed upon by the parties. However, these sums must appear to be a reasonable measure of the damages logically resulting from the failure to perform according to the terms of the contract. They must not be intended as a penalty, out of proportion to the actual damages. If they appear to be so intended, courts will not enforce them.

Naturally, in the case given, the damages would not be collectible if the purchasing agent or other qualified agent of his company were in any way responsible for the delay.

INVENTORY CUT 42%

by applying scientific methods for determining economical ordering quantities for stock items

By R. H. WILSON

General Service Manager
Bell Telephone Laboratories, Inc.

A BUYER or stock control clerk, in determining economical ordering quantities for the purchase of stock for a store or stockroom is often faced with the following conditions:

1. Discounts increase as the lot size increases.
2. Different suppliers offer different discounts from list for quantity purchases.
3. Various periods are given within which payment may be made (called "Payment Periods" in this paper).
4. The larger lots because of size can be shipped at a lower transportation rate than the smaller lots.
5. The risk of obsolescence, depreciation, etc., usually increases as the amount of stock carried increases.

It is obviously very important to determine the most economical lot size to purchase, but standard methods of calculating it are seldom used because they are too long and involved. As a result, the amount purchased generally depends on the judgment of the buyer. Now since so many economic factors have to be taken into account, this selection is exceedingly difficult to make, and if the buyer does not select the most economical lot size there is a loss in profit with no corresponding gain in operation.

This paper describes a new method of determining the most economical lot size. It is so simple, quick and accurate that anyone can use it.

Since discounts generally increase with the quantity of goods purchased there is always a natural desire to purchase a larger quantity and so get the advantage of a lower price. There is, however, a distinct danger in doing this because it costs money to carry additional stock. There is not only more capital tied up, but insurance increases, and there is greater danger from obsolescence and depreci-

TABLE 1

(1) Estimate time stock will last for size of order necessary to get discount from list, and select the line on which this time falls, as shown in the left hand column of the form. (2) Calculate the cost of the order without the discount. Select the column on which the amount of money is indicated in the heading across the page. (e.g. If an order comes to $150. use the column headed $150.) (3) At the point at which this line and the column cross, select the figure shown in the table. From this figure subtract the discount rate, 1 for 1%, 2 for 2%, etc. This figure can then be compared with similar figures obtained from the table after the discount rate has been subtracted. The lowest of the figures so obtained indicates the most economical lot size to purchase. When the list price varies with different suppliers, the discounts should first be adjusted to conform to the highest list price.

TIME STOCK ORDERED WILL LAST	COST OF ORDER IN DOLLARS (WITHOUT DISCOUNT)																	
	5	10	15	20	30	40	50	60	80	100	150	200	250	300	400	600	1000	2000	10000
1/2 WEEK	114.04	107.04	104.71	103.54	102.37	101.79	101.44	101.21	100.92	100.74	100.51	100.39	100.32	100.27	100.22	100.17	100.11	100.08	100.05
1 "	114.09	107.09	104.76	103.59	102.42	101.84	101.49	101.26	100.97	100.79	100.56	100.44	100.37	100.32	100.27	100.22	100.16	100.13	100.10
1 1/2 WEEKS	114.13	107.13	104.80	103.63	102.46	101.88	101.53	101.30	101.01	100.83	100.60	100.48	100.41	100.36	100.31	100.26	100.20	100.17	100.14
2 "	114.17	107.17	104.84	103.67	102.50	101.92	101.57	101.34	101.08	100.87	100.64	100.52	100.45	100.40	100.35	100.30	100.24	100.21	100.18
3 "	114.26	107.26	104.93	103.76	102.59	102.01	101.66	101.43	101.14	100.96	100.73	100.61	100.54	100.49	100.44	100.39	100.33	100.30	100.27
4 "	114.35	107.35	105.02	103.85	102.68	102.10	101.75	101.52	101.23	101.05	100.87	100.70	100.63	100.58	100.53	100.48	100.42	100.39	100.36
5 "	114.43	107.43	105.10	103.93	102.76	102.18	101.83	101.60	101.31	101.13	100.90	100.78	100.71	100.66	100.61	100.56	100.50	100.47	100.44
6 "	114.52	107.52	105.19	104.02	102.85	102.27	101.92	101.69	101.40	101.22	100.99	100.87	100.80	100.75	100.70	100.65	100.59	100.56	100.53
7 "	114.60	107.60	105.28	104.10	102.93	102.35	102.00	101.77	101.48	101.30	101.07	100.95	100.88	100.83	100.78	100.73	100.67	100.64	100.61
8 "	114.69	107.69	105.36	104.19	103.02	102.44	102.09	101.86	101.57	101.39	101.16	101.04	100.97	100.92	100.87	100.82	100.76	100.73	100.70
9 "	114.78	107.78	105.45	104.28	103.11	102.53	102.18	101.95	101.66	101.48	101.25	101.13	101.06	101.01	100.96	100.91	100.85	100.82	100.79
10 "	114.86	107.86	105.53	104.36	103.19	102.61	102.26	102.03	101.74	101.56	101.33	101.21	101.14	101.09	101.04	100.99	100.93	100.90	100.87
11 "	114.96	107.96	105.63	104.46	103.29	102.71	102.36	102.13	101.84	101.66	101.48	101.31	101.24	101.19	101.14	101.09	101.03	101.00	100.97
12 "	115.04	108.04	105.71	104.54	103.37	102.79	102.44	102.21	101.92	101.74	101.51	101.39	101.32	101.27	101.22	101.17	101.11	101.08	101.05
13 WKS. OR 3 MONTHS	115.12	108.12	105.79	104.62	103.45	102.87	102.52	102.29	102.00	101.82	101.59	101.47	101.40	101.35	101.30	101.25	101.19	101.16	101.13
17 " " 4 "	115.47	108.47	106.14	104.97	103.80	103.22	102.87	102.64	102.35	102.17	101.94	101.82	101.75	101.70	101.65	101.60	101.54	101.51	101.48
22 " " 5 "	115.90	108.90	106.57	105.40	104.23	103.65	103.30	103.07	102.78	102.60	102.37	102.25	102.18	102.13	102.08	102.03	101.97	101.94	101.91
26 " " 6 "	116.22	109.22	106.92	105.72	104.58	104.00	103.65	103.42	103.13	102.95	102.72	102.60	102.53	102.48	102.43	102.38	102.32	102.29	102.26
30 " " 7 "	116.59	109.59	107.26	106.09	104.92	104.34	103.99	103.76	103.47	103.29	103.06	102.94	102.87	102.82	102.77	102.72	102.66	102.63	102.60
35 " " 8 "	117.02	110.02	107.70	106.52	105.36	104.78	104.43	104.20	103.91	103.73	103.50	103.38	103.31	103.26	103.21	103.16	103.10	103.07	103.04
39 " " 9 "	117.37	110.37	108.04	106.87	105.70	105.12	104.77	104.54	104.25	104.07	103.84	103.72	103.65	103.60	103.55	103.50	103.44	103.41	103.38
43 " " 10 "	117.72	110.72	108.39	107.22	106.05	105.47	105.12	104.89	104.60	104.42	104.19	104.07	104.00	103.95	103.90	103.85	103.79	103.76	103.73
48 " " 11 "	118.15	111.15	108.82	107.65	106.48	105.90	105.55	105.32	105.03	104.85	104.62	104.50	104.43	104.38	104.33	104.28	104.22	104.19	104.16
52 " " 1 YEAR	118.49	111.49	109.17	107.99	106.83	106.25	105.90	105.67	105.38	105.20	104.97	104.85	104.78	104.73	104.68	104.63	104.57	104.54	104.51
78 " " 1-1/2 YEARS	120.74	113.74	111.41	110.24	109.07	108.49	108.14	107.91	107.62	107.44	107.21	107.09	107.02	106.97	106.92	106.87	106.81	106.78	106.75
104 " " 2 YEARS	122.99	115.99	113.65	112.49	111.31	110.73	110.38	110.15	109.86	109.68	109.45	107.33	109.26	109.21	109.16	109.11	109.05	109.02	108.99
156 " " 3 "	127.48	120.48	118.16	116.98	115.82	115.24	114.89	114.66	114.37	114.19	113.96	113.84	113.77	113.72	113.67	113.62	113.56	113.53	113.50

tion. The interest alone on the capital investment may easily be more than the saving in price. On the other hand, in addition to the saving from discounts, "Payment Periods" and transportation, there is a saving in purchasing routines by placing fewer orders for stock when larger amounts are purchased. These factors are subject to calculation and it has been found possible to provide a table which offers a very easy method of determining the most economical lot size to purchase, taking them all into account.

Naturally this table will vary with each business or with each stockroom in a given business because of the different operating factors involved, but it will be shown later how to obtain such a table. Suppose such a table (Table I) has been prepared for a given store or stockroom, it is then a very simple matter to analyze the terms of any or all suppliers.

Example

Suppose an item costs 5c, is being used at the rate of about 1500 per month and that terms are offered as follows:

Company A
1% discount if purchased in lots of 5,000
Company B
1% discount if purchased in lots of 3,000
2% discount if purchased in lots of 6,000
3% discount if purchased in lots of 12,000

Also assume that the use of this item is increasing at the rate of about 100 a month. Under these conditions an average of 1550 will be used the next month, 1650 the month after that, etc.; so that without considering the discount at present:

3000 at 5c each would cost $150 and would last about 8 wks.
5000 at 5c each would cost $250 and would last about 3 mos.
6000 at 5c each would cost $300 and would last about 3½ mos.
12000 at 5c each would cost $600 and would last about 7 mos.

From Table I, using the cost of the order (without discount) and the number of weeks or months the order will last as given above, the following results are obtained:

TABLE II

Lot Size	Cost of Order	Time Order Will Last	Figure from Table I
3000	$150	8 Wks.	101.16
5000	250	3 Mos.	101.40
6000	300	3½ Mos.	101.53
12000	600	7 Mos.	102.72

Now in order to take care of the discount, 1 should be subtracted from the figures in the last column if the discount rate is 1%; 2 should be subtracted for 2%, 3 for 3%, etc. If this is done for the above example the following is obtained:

TABLE III

Lot Size	Figures from Last Column Table II	Discount Rate	Index Figure Figures from Col.2 Less Discount Rate
3000	101.16	1%	100.16
5000	101.40	1%	100.40
6000	101.53	2%	99.53
12000	102.72	3%	99.72

The index figures in the right-hand column of Table III are not actual costs, but indicate whether it costs more or less to carry the item, taking into account all the economic factors previously listed and the different discount savings on the orders. So the smaller the figure in the right-hand column the more economical is the order associated with it. Hence the order to place in the above example is one for 6,000 items at 2% discount.

It should be noted that in actual practice Tables II and III would not normally be made when using the discount tables. All that is necessary is to jot down the figures that go in the right-hand columns. This only takes a few minutes and in this short

Several innovations in storeroom service have been developed at Bell Laboratories. Above: Specimen parts mounted on panels show the prospective user exactly what is carried in stock and facilitate his selection. Below: A self-service stockroom, where the engineer picks out just what he wants before writing his requisition.

Mr. Wilson, shown at the left in the lower photograph, joined the engineering department of Western Electric Co. in 1914, and was intimately associated with the development of transatlantic radio equipment and various types of vacuum tubes for war purposes. He has been with Bell Laboratories since 1919. As General Service Manager, he is in charge of central stores, traffic, photostat and blueprint facilities, files, and general office services.

space of time the most economical size of order is definitely and accurately selected.

It is recognized, of course, that there are still other practical considerations which must be taken into account and which might affect the amount of stock to order. These are (1) availability of cash to purchase large quantities of stock instead of using it for advertising or selling or in any other part of the business, (2) seasonal demands, (3) perishability of the item, (4) effect of transportation and (5) amount of storage space required. If the purchase of the item is not affected by any of these, then, as stated above, the most economical size of order to select can be obtained by using Table I.

Sometimes the terms are more complicated because (a) the list price is different for different suppliers, and (b) the discount terms are in series. An example for both cases will show how easily they can be handled.

(a) Suppose in the example already given, Company A has a list price of 5c and Company B a list price of 4.9c. This means that the Company B is giving an additional 2% (.1c on 5c) on all its orders. The calculation in Table III should be made as before at a 5c list price, but 2% more should be subtracted from the figure obtained from Fig. I for the lot purchased from Company B. If the discount as calculated is not a whole number, subtract whatever figure of discount rate is obtained.

(b) When the discount is given as a series, say, 20—5 and 1%, it should be converted to one discount rate. In the case given, it is 24.76%. This means that 24.76 should be subtracted from the figure obtained from Table I.

In the *Harvard Business Review* for October, 1934, a paper was published called "A Scientific Routine for Stock Control" which describes a routine method for determining the most economical "Ordering Amount" for any stock item when discounts, etc., for larger lot sizes do not enter into the transaction.

In that paper it was shown, with reference to the ordering amount, that all the stock control clerk is required to do is to determine the rate at which any item is moving and use this in a table similar to the following to obtain the most economical amount of stock to order for the particular item under consideration.

Of course, the table has to be prepared to meet the operating conditions of the stockroom but this

TABLE IV

ORDERING AMOUNT

Quarterly Demand in Dollars	Ordering Amount in Dollars	Quarterly Demand in Dollars	Ordering Amount in Dollars
5	18	300	135
10	25	400	160
15	30	600	195
20	35	800	220
40	50	1000	250
60	60	2000	350
100	80	3000	430
150	95	5000	560
200	110		

can easily be done as described in that paper. As given above it meets the same operating conditions as Table I.

The ordering amounts determined in this way are such that the interest on the investment in stock, depreciation, obsolescence, insurance and the cost of reorders when added together are as low as possible.

Sometimes it is found that buying the most economical amount to stock, as determined in Table IV where discounts are not considered, is more economical than purchasing the most economical lot with discount and it is generally well to make this check. Since the item is moving at the rate of 1550 the first month, 1650 the second, and 1750 the third, the quarterly rate of movement must average 1650 and at 5c each this is 3 x 1650 x 5 or about $250 worth. From Table IV the amount to purchase (neglecting discounts) is approximately $125 worth (2,500 units) which would last approximately 6 weeks. Introducing this into Table I, a figure of 101.12 is obtained. This is larger than the lowest figure in Table III, so 6000 at 2% should still be purchased.

Variation in Periods Allowed for Payment

Quite frequently variations in periods allowed for payment ("Payment Periods") are offered as well as discounts. Suppose in the above example that Company A's terms are 90 days while Company B will only offer 10 days. The effect on the overall cost can readily be found by the use of Table V. Suppose the interest rate on money invested in stock is 5%, then the credit for 10 days (From Table V) is found to be .14 and the credit for 90 days is 1.23. In order to take "Payment Periods" into account, these figures should be subtracted from the figures obtained from Table I. When this is done, after deduction for discount, the results obtained are shown in Table VI. Since the lowest figure again expresses the best terms, it is now found most economical to purchase 3,000 from Company A at 1% discount, net 90 days.

Transportation

As the lot size increases there is usually a good chance to make a saving on transportation. In general this is not an amount large enough to warrant the purchase of a larger lot size but since the larger lot is usually associated with a larger discount the combination may be so profitable that the larger lot should be purchased.

It would be both tedious and impractical to prove this by taking into account all the economic factors one by one but it becomes a simple matter if the discount table (Table I) is used. The following example will illustrate the method to be followed.

Suppose in the example given on page 2 there is a saving of $1.50 on transportation if the item is bought in lots of 6000 instead of 3000 or 5000 and a saving of $3.60 if bought in lots of 12,000. Proceed to find the most economical size of lot taking into account both discounts and Payment Periods until Table VI is obtained. The first and last columns of this table are repeated in Table VII.

Now express the transportation saving as a discount. This is easily done by multiplying the saving on transportation by 100 and dividing by the cost of the order. On the 6,000 lot at a cost of $300 there is a saving of $1.50 so this is equivalent to a discount of $1.50x100/300 or .50%. On the 12,000 lot at the cost of $600 there is a saving of $3.60 so this is equivalent to a discount of $3.60 x 100/600 or .60%. (A table from which these figures can be obtained directly should be made if these calculations have to be made often). Now subtract these discounts from the figures in the right-hand column of Table VII, deriving Table VIII.

As before, the lowest figure in the right-hand column indicates the most economical lot size to order: it will be noticed that whereas before it was the order for 3,000 it is now the order for 6,000 items due to the saving in transportation.

More Risk When Purchasing Larger Lot Sizes

Table I has been prepared with a 2% risk charge included in the carrying rate on stock for depreciation, obsolescence, etc., which should apply to a moderately sized lot. Suppose that a larger lot should carry a 5% charge because of the increased risk. To take care of this, simply multiply the number of weeks the larger lot size will last by the difference in the risk factor (5%—2%) or 3% and add the result to the number obtained from Table I after making all deductions for discounts, Payment Periods and transportation. As before the lot with the lowest figure is the most economical one to carry. It is obvious, of course, that if the small lot is already the

TABLE V

To be used with the discount table (Table I) to apply the correct factor for savings from variations in periods allowed for payment. Subtract the figure given below for the correct interest rate and payment periods, from the figure obtained from Table I after the discount rate has been deducted. Do this for different lots and payment periods, and the lowest figure indicates the most economical lot size to purchase.

PAYMENT PERIODS (DAYS)	INTEREST RATE ON CAPITAL INVESTED IN STOCK			
	4%	5%	6%	8%
5	$0.05	$0.07	$0.08	$0.11
10	.11	.14	.16	.22
15	.16	.21	.25	.33
20	.22	.27	.33	.44
30	.33	.41	.49	.66
60	.66	.82	.99	1.32
90	.99	1.23	1.48	1.98

most economical regardless of risk this check does not need to be made.

To see how this works take the same example as before and suppose that the 2% risk charge included in Table I is satisfactory for the 3,000 lot but that the 5,000 and 6,000 lots should carry a 5% charge and the 12,000 lot an 8% charge because of the increased risk. Take the 5,000 lot first. From Table II, it is seen that this amount will last 3 months or 13 weeks. So the amount to add to the figure for this lot in Table VIII is (5%—2%) times 13 or .03 x 13 or .39. The resultant index figures are shown in Table IX.

Again the lowest figure in the right-hand column indicates the most economical size of order. Due to the increased risk it is seen that it is advisable to purchase 3000 instead of 6000.

Preparation of Discount Table (Table I)

When purchasing a supply of stock there are two factors which together determine the operating charges. One is the share of general overhead which remains constant for a given period of time and the other includes all the variable charges such as interest on the capital invested in stock, a charge for insurance, obsolescence, depreciation, purchasing costs, etc.

Now Table I is used to make a comparison between different methods of carrying stock for any one stock item. Consequently the charge for overhead can be taken at any figure because it cancels out when the comparison of costs is made. In the table it has been taken as $100.

The second factor includes all the variable costs listed above which change with the amount of stock carried; and has been based on each $100 worth of stock sold in a year. This allows the desired comparison of costs and has two advantages; the table can be used for any stock item regardless of the amount sold in a year; and the discount can be taken as 1 for 1%, 2 for 2%, etc., as explained in the text.

In Table I it has been assumed that the carrying charge is 9% (made up of 6% for interest on capital invested in stock, 2% for depreciation and obsolescence and 1% for insurance) and that 70c is the average cost of placing additional orders for stock.

Other stockrooms will, of course, have different operating factors than those given above. The author will, on request, be pleased to discuss the preparation of a similar table for different operating conditions.

TABLE VI

(1) Lot Size	(2) Discount	(3) Figure from Table I less Discount Rate	(4) "Payment Periods"	(5) Credit from Table V	Index Figure
3000	1%	100.16	90 days	1.23	98.93
5000	1%	100.40	10 days	.14	100.26
6000	2%	99.53	10 days	.14	99.39
12000	3%	99.72	10 days	.14	99.58

TABLE VII

Lot Size	Index Figure
3,000	98.93
5,000	100.26
6,000	99.39
12,000	99.58

TABLE VIII

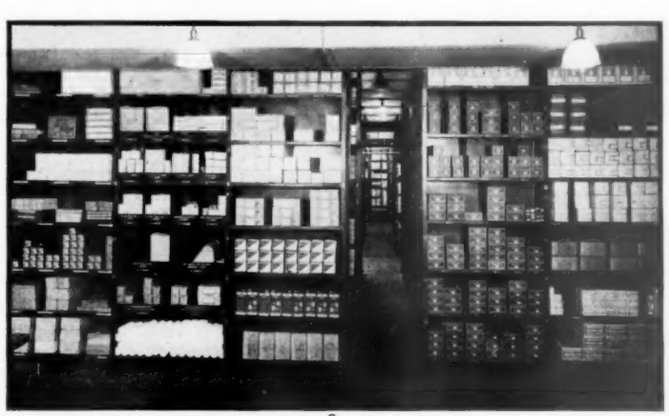
(1) Lot Size	(2) Net Figure Table VII	(3) Saving from Transportation Expressed as a Discount	(2)-(3) Index Figure
3,000	98.93	—	98.93
5,000	100.26	—	100.26
6,000	99.39	.50	98.89
12,000	99.58	.60	98.98

TABLE IX

Lot Size	Index Figure Table VIII	Time Lot Will Last	Add for Increased Risk	Index Figure
3000	98.93	8 weeks	—	98.93
5000	100.26	13 weeks	.03 × 13 = .39	100.65
6000	98.89	15 weeks	.03 × 15 = .45	99.34
12000	98.98	30 weeks	.06 × 30 = 1.8	100.78

TABLE X

Year	Inventory	Weekly Demands on Stockroom	Number of times Out of Stock per 100 Demands
1931	$62,046	1,833	No record
1932	41,262	1,274	"
1933	36,314	993	"
1934	37,869	1,139	0.30
1935	38,082	1,266	0.43
1936	36,212	1,405	0.28
1937	37,286	1,562	0.24
1938	33,525	1,459	0.35
1939	35,894	1,482	0.34



Operating Results

Several of the stockrooms in Bell Telephone Laboratories, Inc., which had been operating for years on the basis of ordering stock in accordance with the judgment of experienced stockkeepers, were placed in 1931 under the system described. Further improvements in the system have been made since that date, including those given in this paper, and as they were perfected they were put into use. The effect on the inventory during a nine-year period is shown in Table X.

It will be noticed that the inventory dropped 42% while the demands ultimately decreased by about 19%. It will also be noticed that since 1934 the demands have increased by 30% while the inventory has decreased 5%. Meanwhile the out-of-stock condition was maintained at the figure set in advance: once out of stock for every 300 demands.

Silhouette STUDIES

G. L. HARTMAN, Purchasing Agent of The Oilgear Company, Milwaukee, joined that organization in 1922, when the company was just eight months old. Gil had just taken his degree in Mechanical Engineering at Marquette University, but along the way he had acquired seven invaluable years of diversified shop experience, the combination providing an ideal background for the purchasing requirements of a company with a highly engineered product.

A native of Manitowoc, Wisconsin, young Hartman early felt the urge to mechanical endeavor, and left high school after two years to take a job with the Waukesha Motor Company, where he was placed at exacting work in the tool room, and loved it. The depression of 1914 came along, and as the youngest employee he was laid off, but his interest in shop work was stronger than ever. He found an opening at the Waukesha Bridge Works and later returned to the motor company.

After two years, he saw the advantages of finishing his education. By concentrated effort, he completed the balance of his high school course in one year, and saved enough in a year of tool making at the Allis Chalmers Manufacturing Company to enroll in the Engineering College at Marquette. Under the cooperative system, school terms alternated with periods of practical work in local industrial plants. Over the next five years, with a little time out for the army, Hartman made the first hand acquaintance of the Allis Chalmers foundry and operating departments, and did time study and routing for Nash Motors, while earning the Tau Beta Pi key in his engineering studies.

In the young and small organization at Oilgear, he had contact with many phases of the work, including purchasing, which was of relatively minor importance at the start. As the company grew, however, the work increased in volume and consequence. Hartman devoted more and more of his attention to buying, and today heads a compact and efficient department of four, handling purchases, stores, receiving and shipping. Intimate familiarity with materials and their application, and what is expected of them, help to make it a real service department, where the language of the production and technical men is understood and spoken.

In the Milwaukee Association of Purchasing Agents, which he joined in 1926, Gil has served as secretary, vice president, president, and national director. He has taken a keen interest in association work, both local and national, particularly in the educational program. A couple of years ago he headed a regional judging committee on the Boffey Award. He inaugurated round table discussions of purchasing topics at the Milwaukee meetings. For several years he has taught engineering subjects at the Milwaukee Vocational School, and has taken an active part in the purchasing courses at Marquette University and the University of Wisconsin Extension Division.

Golf and a well equipped basement workshop provide year-round recreation. Summer vacations are always family affairs, for Mrs. Hartman and three fine daughters share his enthusiasm for swimming, fishing, and roughing it in Wisconsin's northwoods. He finds time, too, to do his part as a good citizen, and has turned in an excellent report as Division Commander in Community Fund work.

G. L. HARTMAN

RENE H. GARROT, Division Purchasing Agent of the United Fruit Company at New Orleans, has spent the whole thirty years of his business life with that organization. Ten days after his graduation from the School of Business and Commerce, St. Aloysius College, he got a temporary job as an extra stenographer during the vacation period. It was supposed to last only a few weeks at the outside, but they kept finding new jobs for the youngster to do, so that in the course of the next three years he acquired a well rounded training in many phases of the company's operations, working successively for the Port Captain, Port Engineer, General Agent, Accounting Department, Wireless Accounting, Commercial Freight Agent, and Passenger Department.

In the latter part of 1913 he was assigned to clerical work in the Purchasing Department, and presently climbed to the top of that particular ladder with his appointment as Chief Clerk. In 1923 he was appointed Buyer. Two and a half years later he was Chief Buyer, in 1928 Assistant to the Purchasing Agent, and in 1930 Division Purchasing Agent, the position he now holds.

His success in purchasing is largely due to the fact that he has never tried to complicate the function unnecessarily. He considers the department primarily as a service organization, with perfect cooperation as the chief essential. His own experience in the various de-

R · H · GARROT

partments before he came into purchasing work helps to make that cooperation intelligent and effective.

His talent for cooperation is also apparent in his association record. He served two terms as president of the New Orleans Association, 1934-1936, and a year on the national executive committee as vice president for District No. 7. He was Vice Chairman of the N.A.P.A. convention at New Orleans in 1936.

His golf game is rated as "good to fairly good." It might be better but for the fact that he plays strictly for amusement, and business gets the first call on his time and serious attention. His real hobby is wall painting and the finishing of woodwork. He is also active in the Carnival Clubs, holds a lieutenant's commission in the U. S. Naval Reserve, and is a worker on the New Orleans Association of Commerce Committee for the Advancement of New Orleans. His daughter, Shirley, has just completed her sophomore year at Newcomb College, Tulane University.

BASIL L. NELSON, Division Purchasing Agent of the Northern States Power Company, has a most consistent record. A native of St. Paul, he has lived there all his life. His first job, fresh out of high school, was as a purchasing department clerk; within a year he was doing the buying, and he's been purchasing for that company and its successor ever since. In 1926, two years after joining the Twin City Association, he was elected secretary-treasurer of that organization, and he's been re-elected annually for fourteen terms.

In the early days of his buying career with the St. Paul Gas Light Company, he commenced the study of law in the evening courses of the St. Paul College of Law. But after two years, eye trouble dictated an immediate abandonment of night school study. He has, however, found abundant satisfaction in purchasing work, which he considers one of the most interesting and useful threads in our economic fabric.

In his business philosophy, the entire structure rests upon the foundation of buying and selling, and it follows that any improvement made in the relationships existing between these two business functions naturally makes for a more sound and stable structure. In twenty years of purchasing he has seen this relationship improved tremendously. The type of buyer and of seller has changed. Each has become more expert, attained greater knowledge of the work he has to perform, has developed a greater understanding and sympathy for the other's position as well, and has expressed this in greater cooperation, curtailing industrial wastes and increasing efficiency all around, to the benefit of all industry. Nelson himself, both as a competent buyer and as an active association worker, has contributed no little to this development.

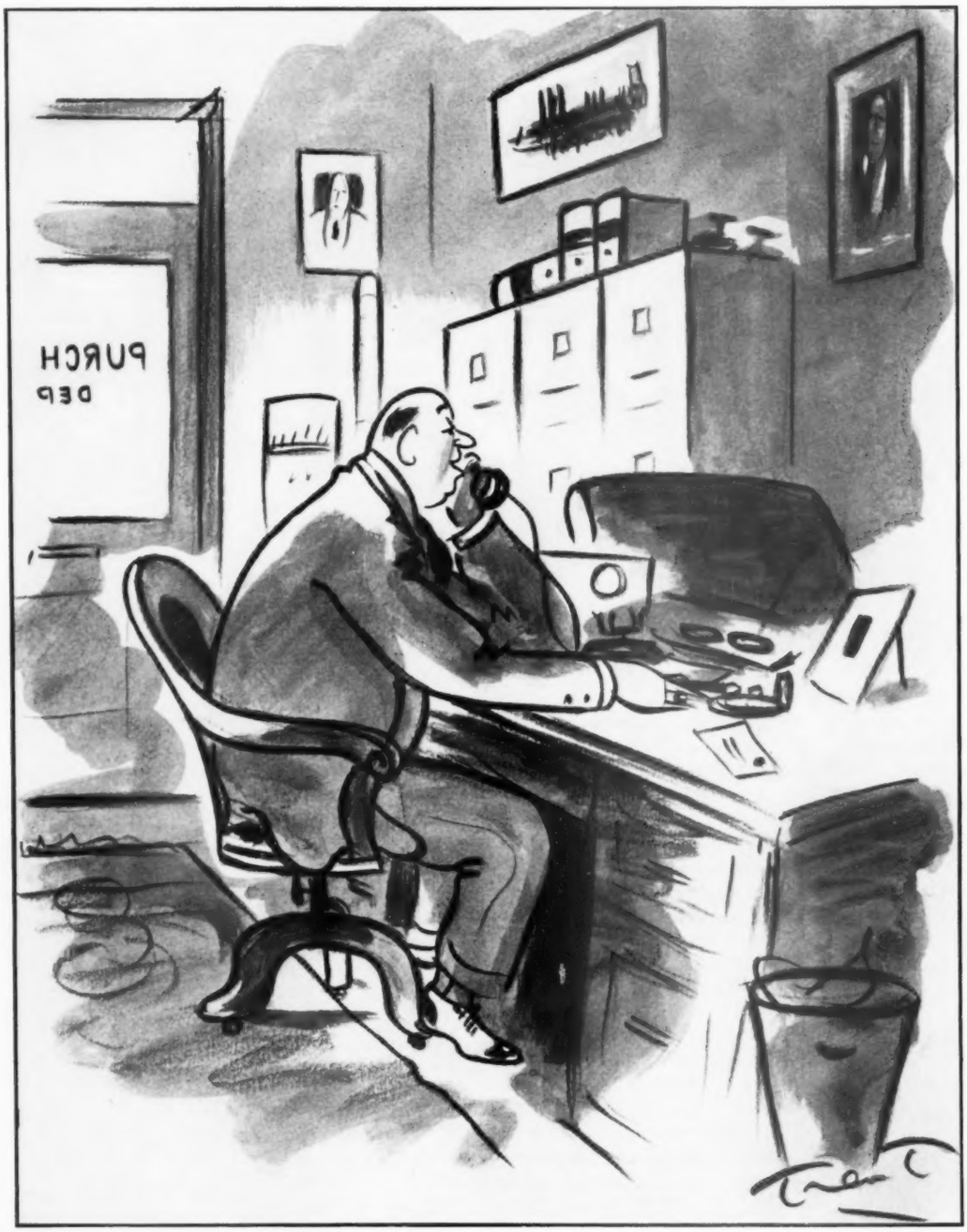
His abundant energies have been usefully applied in a wide variety of activities. He is a past president of the St. Paul Traffic Club, and has served that organization in many capacities. He is president of the second largest Parent Teacher Association in Minnesota. He has taken an active part in the local Community Chest for many years. Four years ago he was one of the organizers of the St. Paul Winter Sports Carnival Association, and served as its Purchasing Agent during the first two years of its existence. It is a noteworthy record of achievement for a busy executive not yet out of his thirties.

Ever true to St. Paul, Basil married his grade school sweetheart. They have two children: Marilyn Jeanne, aged 12, and Basil, Jr., 6.

Music has always been one of his favorite diversions. He has sung with the Orpheus Club, St. Paul's largest male chorus, and is still tolerated in the baritone section of the church choir. Around home, and strictly for his own amusement, he frequently does a bit of fiddling.

In sports, swimming remains his pet activity, which is natural enough since he was an able competitor during high school days and spent his summers as a life guard. He enjoys golf, but admits that he is getting no better fast. At the present time he is chairman of his company's golf league. Hunting is also one of his pleasures, in the Minnesota woods, of course.

B · L · NELSON

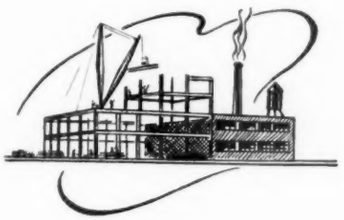


"The Chairman of your Board wrote thanking me for a $30 order. I'm merely calling to tell him he's welcome."

SIX PRACTICAL PAPERS FROM THE GROUP MEETINGS AT THE N. A. P. A. CONVENTION

STEEL SALES PROBLEMS

By N. J. Clarke
Vice President in charge of sales
Republic Steel Corporation



AS business is done today, it is perfectly obvious that no company can return a satisfactory net profit without intelligent buying on the part of its purchasing organization. In our Republic conferences, in which I frequently take part with our purchasing people, I am continually impressed with the heavy responsibilities they carry on their shoulders.

First, with navigation open only part of the year, our purchasing people must estimate our ore requirements for the following season, not only as a whole but at individual producing points. This requires long-range forecasting of a high order. Scrap requirements must be figured weeks and even months ahead. Such items as pig tin, manganese and other vital necessities which must be imported today from actual belligerents or from countries in the very shadow of war present tremendous problems.

Then there are brick, timber, coal, limestone and hundreds of other items, all of which have their peculiarities and varying market conditions. These purchasing conferences have a chastening effect on me, for I come away with the feeling that we peddlers really have a rather simple job compared to yours.

Public Relations

Whether they realize it or not, the purchasing executive and his assistants occupy front line outposts in the field of public relations. They can play a great part in building and maintaining a favorable relationship for their company with industry in general. Salesmen circulate widely. They are the radio announcers of business, and sometimes, I must admit, the town criers.

If the salesmen who call upon you are treated with courtesy and consideration, their opinion of your company soon becomes known to the many other people they encounter in the course of their work. Public opinion is an intangible thing, but it is built up by the little things that people come to believe about you through a few words dropped here and there. And no company ever succeeds over the long pull without the support of the man in the street.

Perhaps it is unnecessary to have mentioned this. I know from experience that the salesman's life is far more pleasant than it once was. We still hear complaints on the time salesmen must waste waiting for interviews, but I find that the salesman who is really performing a service for his customers spends very little time cooling his heels. By the same token, we hear occasionally of the buyer who crawls into his hole and defies the salesman to sell him. He doesn't worry us too much because if his management is alive to its responsibilities he won't be a buyer very long.

What we are all after in the long run is to reduce the cost in time, money and effort of both selling and buying, and this can only be done by both buyer and seller acquiring a workable understanding of the other's problems.

Price Policies

As I look back on my early days in sales work, it seems to me that price was the determining factor in a great number of purchases. Quality and service carried some weight, but the buyer who received the most orchids from the front office was the one who could, by any means at his disposal, reduce the seller's profit to the vanishing point.

That policy, I am happy to say has been modified materially in recent years. I have been around too long to believe that this is due to a surge of compassion and brotherly love on the part of the buying fraternity. It has come about for the simple reason that it is good business. The better qualified buyer of today is better posted on markets and on values than his predecessor. He knows that within reasonable limits there is a bottom price for every commodity. He keenly realizes, moreover, that all businesses are inter-dependent, that no one can prosper greatly or for long at the expense of others. As a broad-gauge executive he is just as anxious, while spending his firm's money to best possible advantage, to promote better general conditions—just as anxious as any salesman or any operating man.

There are occasions when any buyer is able to buy at ruinous prices because the salesman is there to get the business at any price. Perhaps he is trying to supplant some long established competitor. Perhaps his management is trying to increase plant operations on the misguided premise that a higher operating rate will somehow return a profit regardless of the realized price. Or he may represent one of those outfits, fortunately becoming less numerous, who do not know their true costs and can not establish the breaking-point between profit and loss.

I consider it to be a sales function, and not a purchasing function, to establish fair prices and see that they are maintained. I become more convinced that most of the disastrous price breaks which occur from time to time in every industry are due to the sales departments' over-eagerness to get business rather than to the buyers' insistent pressure for concessions.

There was a day when the cost structure was flexible enough to permit some price concessions without complete sacrifice of profit. Today this flexibility has largely been eliminated. I am thinking largely in steel terms. As you are well aware, it is not only in base prices that cuts occur, but that extras can also be cut, terms can be modified and a dozen other ways can be found to reduce the net. The extras which I mention, applying to both quality and sizes, are designed to cover only the additional cost involved. If they are excessive they defeat their purpose by becoming an invitation and an incentive for price manipulation.

It is unfortunate that many buyers look upon extras as "gravy" added by the steel producers to conceal their real prices. We need to convince steel users that extras are intended purely to compensate for additional costs of production.

Most purchasers are opposed to sudden upsets in the price structure of materials used in the manufacture of their products. If they have reasonable inventories on hand they face substantial write-downs, which, rightly or wrongly, reflect on the buyer's judgment. Moreover, they are at once confronted with the necessity of deciding whether to load up at the low level or wait for a still lower price at the risk of missing the boat entirely. Production plans, based on a certain price level, must be revised. If the flurry is a short one, it is highly questionable whether the lower prices benefit anyone.

Fixed Costs Are Higher

Many factors have contributed in recent years to the increasing rigidity of our cost structure. Not only have costs risen rapidly, but a substantial proportion of them are entirely beyond any possibility of correction on our part through the usual channels of better methods or increased efficiency. These new elements of cost apply to every business, large or small. In proportion they weigh heavily on every organization, and play a large part in the long postponement of business stabilization.

Higher Federal, State, County and City taxes not only serve to increase the taxpayer's direct burden, but apply as well to every vendor from whom we purchase material, resulting in a complete cycle of higher costs. Another result is the virtual doubling of our accounting and legal work, as well as the enormous increase in the cost of making tax returns, schedules and reports. All of these extra costs must be passed on, by all industry to the users of its product and finally to the ultimate consumer whom these taxes were designed to benefit.

There are many other elements, some of them highly artificial by former standards, which enter into fixed costs today.

Steel wages are now above 1929 levels.

Wage increases have been continued without regard to price levels or market conditions.

Most wage workers now have vacations with pay.

The work week has been reduced by law and time-and-a-half must be paid for all over-time. Steel output in 1939 was 16% below 1929. Total employment was up 5%.

Group insurance has become more general.

Welfare expenditures undreamed of a few years ago are now the price of good labor relations.

Wage and hour laws have reduced the productivity of salaried employees. On October 25th the official work week will be reduced from 42 to 40 hours, necessitating still more people to keep the wheels of business moving.

An entirely new burden of legal and accounting expenses due to Securities and Exchange Commission requirements, registration of securities and many others.

Whether we are buyers or sellers, this is a situation of very grave concern to all of us. It is a condition to which we must give increasing attention to the end that corrective action may be taken.

Reciprocity

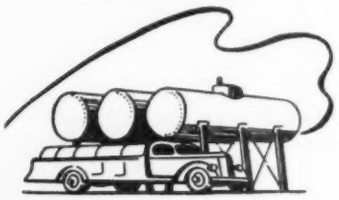
One more factor which has assumed increasing importance to the point of being sadly overdone, is our old friend Reciprocity. It is only natural that we should buy, when we can properly do so, from our friends. But the scientific, systematic highly organized form which reciprocity buying has taken in recent times is as distasteful to most sellers as it must be to all purchasers. If all selling were done on a reciprocity basis, business could close out its sales department, fire the salesmen and substitute a few good, accurate bookkeepers.

Direct reciprocal relations are natural and proper, but when they are carried to the second, third and fourth generation it becomes a serious problem to everybody involved. Certainly it handcuffs the purchasing executive and sadly limits his ability to function in the best interests of his company.

I hope the whole reciprocity question will some day get a thorough overhauling. Where it is carried to extremes it will ultimately defeat its own purpose, for any sales department requiring the constant use of the reciprocity crutch will eventually find itself outdistanced by its more alert and aggressive competitors.

BUYING GAS AND OIL

By Ward Alexander
Assistant Purchasing Agent
City of Schenectady



THERE are three possible ways in which a municipality can purchase gasoline and oil.

(1) A contract with some established chain of service stations for delivery to city equipment in the normal business routine.

(2) Purchase in bulk by the municipality for distribution from a central point.

(3) Purchase in small quantities from several garages or storage places.

Which system shall be used depends to a large extent on the control the municipality has over three other factors:

(1) The centralization of equipment storage.

(2) Facilities to test and control quality of the gasoline and oil purchased.

(3) The facilities to control the distribution without waste.

Inasmuch as Schenectady is a compact municipality, it was decided that the central storing of equipment and the centralized distribution of gasoline and oil after purchase in bulk would be the most economical. In addition, the City of Schenectady has adequate facilities for testing all such purchases. Since that decision was made, year by year improvements have been made in the purchasing, the testing and distribution of gasoline and oil. There are still some weaknesses in the procedures; we are far from having a 100% perfect set up but the set up this year is much better than it was last year, and last year and the years before showed improvements over preceding years.

The big improvement this year has been in distribution. A new gasoline service station has been opened for use with all the most modern equipment and with a very comprehensive record system. On the face of it, this may not seem important from a purchasing standpoint, but when I tell you that before this new equipment was used, we got only about an average of 40 gallons of oil that was accounted for out of a 55 gallon drum, whereas now we account for all of the 55 gallons of oil in a 55 gallon drum, you can easily visualize its importance. In other words, as far as the municipality goes, we are saving 30% on the cost of oil by the use of this new equipment. The savings in gasoline, while not as startling, are also material and bring home forcibly the need for the Purchasing Department to check on the possibilities of distribution before advocating any method of purchase. The first savings may be more than lost by later waste.

For many years Schenectady has had facilities for testing gasoline and oil, but during the last year procedures have been improved and the tests expanded. The normal test was made as to distillation range, corrosion and certain other physical characteristics, and each shipment was accompanied by the refinery certification that the octane rating was not less than 72.

All tests and samples are made in compliance with standard methods of the American Society for Testing Materials and American Petroleum Institute. In addition to this standard sampling procedure on gasoline the City has devised a test for determining the presence of water in the gasoline truck.

Approximately one gallon of gasoline is drawn into a five-gallon container from each of the compartments by the quick openings of a bottom draw-off valve. The gasoline is permitted to settle, the upper portion is decanted and the residue is poured into a measuring beaker. Any water con-

tained in a truck is thus concentrated in the beaker, and the presence of any undesirable moisture is immediately called to the attention of the Purchasing Agent.

With this testing procedure, we are in a position to buy unbranded gasoline and oil under standard specifications, and be certain that we receive what we pay for. However, we do not do this and I expect that the next important improvement in our purchasing procedures will be the purchase of these supplies under contract in accordance with specifications.

When Schenectady's Industrial Center was set up, provision was made so that we could buy in tank car lots. This provision was the installation of two 10,000 gallon gasoline tanks. Possibly because of our nearness to tidewater gasoline storage facilities, we have found that we can buy as cheaply in transport lots as in tank car lots.

The Right Grade

Considerable thought should be given to the grade of gasoline and oil purchased to be sure that it provides most economic operation of equipment. Just as in the case of other commodities, it is not always most economical to buy the cheapest article. Schenectady buys the regular grade gasoline as this has been found to be most satisfactory in its various types of equipment. Determination of the type and grade of oil to be purchased is a much more complicated problem, however; we have found that the various oils do not act uniformly in different equipment. As an example we had considerable difficulty with our diesel engines and some of the small gasoline motors. These troubles were entirely removed after we discovered the proper oil to use. In this case the plugs were constantly being fouled and going out of service. Breakdowns are very costly and all breakdowns that could be traced to the grade of oil used have now been eliminated.

If specifications are used they should be drawn very carefully by someone having thorough knowledge of the problems involved. If only small amounts of either gasoline or oil are purchased, it is desirable to obtain standard products from responsible suppliers, and to purchase by trade names or brands.

Specifications should be broad enough to permit reasonable competition. Allowance should be made for the different methods of manufacture that can produce an acceptable finished product. It is important when purchasing against specifications that the muncipalities should have laboratory facilities to check products purchased. It is advisable that lubricating oil be considered under actual operating conditions in a thorough test, before making a major purchase.

CONTROL OF STORES

By R. C. Harris

General Storekeeper
The Pennsylvania Railroad Company

FUNDAMENTALLY, stock control is a directing, guiding or restraining power over the procurement of materials and supplies. The personnel handling the work therefore must have the ability and experience to direct, guide and restrain. It is imperative for a supply officer not only to realize that sound principles exist for his guidance, but that he take full advantage of them.

Let us look briefly at a few of the principles which may be defined:

First, it is imperative that close and sympathetic contact be made with the users of material. The supply officer must know something about the user's methods and his future plans. There is no adequate substitute for this contact. The supply officer is fortunate indeed if the user works on a budget. In that event he can, through experience, determine the percentage of the budget which is represented by material. It will not tell him how many units of each kind must be provided to carry out the budget, but it will tell him the total value of the material which must be purchased or manufactured. The supply officer must then from his own records determine what is a proper balance among the various kinds of material required. It is here that records of the manner in which stock is used form a vital source of information for future guidance. If a budget is not prepared by the user, the supply officer still has recourse to the plans of the user and his own records for guidance. Without a budget, the work of the supply officer is made far more difficult.

A *second* principle of stock control is the decentralizing of the responsibility for quantities ordered, the direct custody of unapplied material and its distribution to the users, combined with a highly centralized control over the time when orders are prepared, the descriptions of materials ordered, and the general policy which is to govern the preparation or orders. If one hundred men are engaged at widely scattered points in the preparation of orders and must supply users at those points, those men should be trained in the methods you want used and then place upon them the responsibility for the results.

The reason for this is two-fold; first, stock control is most likely to get out of hand when sudden and violent changes occur in economic conditions. It is then that action must be quick and forceful. The combined efforts of every experienced employe engaged in ordering is required to meet the situation. One group alone cannot accomplish the change effectively, and it is here that the training carried along in normal times brings dividends. The second reason is that a centralized ordering group is too far away from the actual use of the material and from the changes that are constantly occurring in that use.

It is easy to drift into the mental attitude of thinking that only the central office is competent to handle the situation. There is too much at stake to place the entire responsibility on one small group at headquarters. The man trained to use his judgment and initiative in normal times will be the man we need in emergencies. To assure this training, he must have the right to determine the quantities he needs. Should the central office have information that the need will be more or less in volume, the originator must be advised and given the right to present his case.

A *third* principle is that the organization must be streamlined — that is, set up for speed. Economic changes occur with alarming abruptness. There is no reason to believe that the future will see any reduction in the pace; consequently, the supply department must adjust itself to meet the latest fashion in economics.

A *fourth* principle is standardization, which vitally affects stock control. The supply department must keep up its crusade for standardization where standardization has a place, and there are many such places. The stock records reveal facts that should currently be brought to the attention of the designer and the using departments to encourage standardization, and when that is accomplished to see that specifications are prepared for competitive procurement after adequate tests have been conducted.

Stock control of course can only be effective when it becomes the exclusive responsibility of a department created for the purpose of producing a supply of materials in the most economical manner. It is human nature to strive directly for results, pushing aside troublesome details even when those details contribute to the desired results. These troublesome details become secondary when handled by a using department because they are not the chief concern of that department. It is the work of the supply department to so organize those details that they may be handled automatically and by concentration may be in such volume as to lend themselves to mechanical operation.

These principles have been described in rather general terms. Now let us

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COUNTY PURCHASING

By Jos. W. Nicholson
Purchasing Agent
City of Milwaukee

AT PRESENT approximately 200 cities, 75 counties and all but two states of the Union have some type of centralized purchasing. The degree of business efficiency of these departments varies from the most inefficient, where the buying function has been centralized in one department presided over by a political appointee chosen for his skill as a vote-getter, to the most efficient which compares favorably with the most successful industrial purchasing department in the country.

When you consider there are 3,070 counties in this country, it is surprising that so few as 75 have done anything in this direction. In this group of 75, however, will be found some of the most efficient public buying organizations in existence.

The study of county purchasing was started by the Governmental Purchasing Committee in November, 1937. At that time it was found that information was very meager as apparently no previous attempt had been made to obtain and correlate this information. The first step was to contact the 3,070 counties by questionnaire. This questionnaire sought information as to laws, practices and administrative organization relating to county purchasing. The replies received were sufficient to form an authentic basis for the development of this study.

In collaboration with this study Robert A. Martino, Division of Codes and Specifications, National Bureau of Standards, Washington, D. C., sent a questionnaire to the purchasing officials of all counties to determine the extent of the use of U. S. Government standards and specifications as well as the extent of inspection and testing practices; whether purchasing is centralized and by what authority; also the method of appointing the Purchasing Agent, by civil service or otherwise.

Mr. Martino received a total of 1,177 replies. It was found out that in more than 600 counties purchases are made by the county clerk, by some other individual appointed by the supervising board subject to board approval or by the board itself. In 500 other counties it was stated that no purchasing agency was maintained and that purchasing is done by the heads of individual departments or institutions. However, the purchases of many of these counties are subject to the approval of the county purchasing board.

Among the 75 counties having centralized purchasing, the purchasing authority is usually appointed by the supervising board or commission of the county under the general authority granted to it by the state legislature. The duration of their appointment, in many cases, is indefinite and subject to the pleasure of the governing board. In a few cases the appointment of the County Purchasing Agent is made on an annual or biennial basis. When the county manager plan is in effect, the manager usually appoints the Purchasing Agent. In several counties civil service examinations are held for the selection of administrative officials.

Standards and Tests

Regarding the use of standards and specifications in county purchasing, the survey showed that approximately 523 counties reported general use of standards and specifications on which to base contracts for purchases. Technical specifications for road and bridge construction are usual'y prepared by the county engineer or the superintendent of highways. On other types of general specifications, Purchasing Agents or committees consisting of the Purchasing Agent and departments interested prepare specifications for materials, supplies and equipment. Approximately 112 counties state that they have adopted and used Federal specifications on which to base contracts for purchases while 75 employ standards and specifications prepared by national technical organizations' testing laboratories.

Of the 162 counties in 28 states reporting the use of laboratories for testing commodities purchased by the county, only 14 maintain their own

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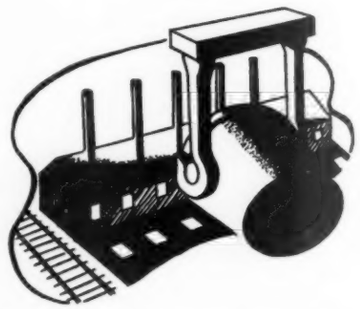
STANDARDIZATION AND SIMPLIFICATION IN THE STEEL INDUSTRY

By R. E. Zimmerman
Vice President in charge of
Research and Technology
United States Steel Corporation



EXPERIENCE throughout industry has been that a reasonable degree of standardization has exerted a constructive and helpful influence in many ways. It has made for efficiency and economy in production and has reduced or eliminated confusion in use. Both the producer and the consumer have gained thereby. So well has the principle operated with respect to numerous commonly used products that items falling outside the standard fields are called by special names.

In widely diversified fields the advantages of standardization are readily recognized. From pipe sizes to safety codes, building blocks to food containers, hose connections to railroad track gauges, the adoption of standards has been beneficial. Automobiles are available, not to individual specification but in standard models produced in quantity and at low cost, so that they are within the financial reach of millions of purchasers. Variations in nonessential features are procurable, but at increased prices. Suitable tires may be secured almost anywhere in America because sizes have been standardized. Electric lamp sockets are uniform throughout the country and there is no longer the tedious ordeal of fumbling in the attempt to connect a fixture cord to an ill-fitting outlet receptacle. Standardiza-

tion has been projected into so many processes and products now in daily use that we forget the laborious measures by which it was advanced from one item to another, step by step. The tendency is to take for granted many of the benefits which were won by years of evolution and patient endeavor.

It is readily apparent that whatever of standardization there be, it must be expansive enough to provide for necessary variety and selection, and dynamic enough to permit of improvement and progress.

In the steel industry, standardization has not been irrationally reverenced, but it has not, by any means, been treated as a stranger. Almost fifty years ago the Association of American Steel Manufacturers, after due experiment and investigation, adopted a set of standards relating to the physical properties and chemical composition of boiler plate, structural steel, and rivet stock. The specifications served a useful purpose in their time, but with continual advancement in the technique of steel making and with new requirements arising in the trade, they became obsolete and have long since been superseded by others.

Standardization of products, which is logically of more direct interest to the consumer than standardization of processes, has been playing an increasingly important role in the steel industry for several decades. One of the interesting examples is the standardization effected in the series of wide flange beams, whereby the respective numbers produced by the several manufacturers are readily interchangeable. The provision of the convenient and logical geometric series of beams was, of itself, an effective move toward simplification and economy; the added feature of interchangeability enhanced the value of this whole project for the structural industry. Similar benefits were realized when sheet steel piling was rationalized as to design, then standardized, and produced in sections best suited to meet the conditions encountered in engineering practice.

Pig iron, the product of the blast furnace, is regularly produced in grades which have been set up as standard for specific purposes. Each fully integrated steelmaker may produce whatever kind of iron he chooses for his own open hearth or Bessemer operations, but he does not have any such leeway in supplying iron for foundry purposes. As a matter of fact, even in the case of the metal intended for conversion into steel, the supposed degree of freedom is something of an illusion, because economic considerations as well as metallurgical factors demand that iron for open hearth

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ENGINEERING ASPECTS OF CORRUGATED CONTAINER PURCHASING

By A. V. Grundy

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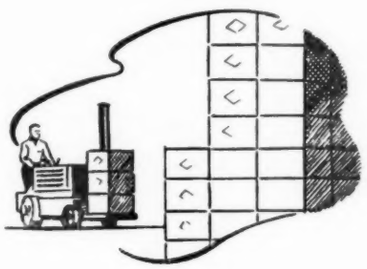


ABOUT six years ago an investigation was carried out in our plant with the object of ascertaining if savings could not be made by revising the dimensions of some of the fibre shipping cases used for packing our main items. By re-assembly of some of the units in the cases or actually changing the number of units packed to the case, considerable savings were made by reducing the total area of the sheet required to make up the new proportioned cases. The cutting down of the flap area of the cases played a most important role in attaining the desired results.

A complete survey of warehouse conditions in both cosmopolitan and other areas was carried out and reports show that shipping cases were not only badly damaged in transit, but were also breaking down in storage, with consequent damage to their contents.

The results of these surveys and investigations threw an entirely new light on the manner in which shipping cases were damaged in transit and storage, compared to the conception most people had of the treatment shipping cases undergo during shipment by truck, rail or boat. The fatigue load which cases were expected to counteract when stacked in some outside warehouse, was also unbelievable.

The next step undertaken was to remove as much as possible all unnecessary causes of damage to shipping cases by bringing same to the attention of the various transit companies, who immediately gave us their full co-operation in every way possible to eliminate these factors. Remarkable results were obtained on later shipments of merchandise to the same territories from which most of these complaints had originally been received.

Further steps were taken to minimize the efforts of uncontrollable damage the containers had received at their most vulnerable points during transit, as brought out during the survey, by strengthening the cases at these weak spots.

As a result of information obtained from various suppliers and independent testing laboratories, it was decided that we would immediately adopt some of their suggestions to improve and strengthen the quality of our shipping cases, but in order to really be certain that improved strength quality had been incorporated in the new cases, it was imperative that the necessary testing equipment be immediately installed at our Control Laboratory in the plant.

We, therefore, erected a beam type Compression Testing Machine which was a duplicate of one which had been in successful operation at one of our supplier's plants for several years. In place of a Constant Humidity Room for conditioning the cases prior to tests on the machine, we place them in a room which is least subject to rapid changes in atmospheric conditions, leaving them exposed to room temperature for a period of at least 48 hours to attain equilibrium as soon as possible before testing. Wet and dry bulb thermometer readings are taken to obtain the Relative Humidity at the time the cases are subjected to Compression Tests and by means of a conversion factor table these readings are transposed to give results obtained at 38% Relative Humidity and 7% Moisture Content. Duplicate tests carried out by various suppliers and an independent laboratory, compared to the tests on our own Compression Machine, showed that both the machine and Relative Humidity Factor Table were accurate enough for practical industrial purposes.

We were now in a position to check the quality of all shipping cases received from our various suppliers relative to compression resistance. Without the use of this Compression Machine it would have been impossible to check the quality of the cases delivered to us by our suppliers and find out the many causes of previous failures of our cases which had for years been indiscernible, by mere visual or manual inspection.

		Comparative Values of Commercial Grades of .016 Liner	COMPARATIVE VALUES OF DOUBLE FACE A FLUTE CORRUGATED CASES WITH EQUAL FABRICATION Same as .016 Liner Inside and Out, Vertical Corrugations									
			Weight		Mullen		Comparative Score Line Strength %					
							Vert. Scores		Horiz. Scores		Compression %	
		Mullen Actual	32# Straw	26# Kraft	32# Straw	26# Kraft	32# Straw	26# Kraft	32# Straw	26# Kraft	Top	End
100#—.016 Jute or Filled Cyl. K.												
	High	110	196	186	240	250	108	123	105	131	108	110
	Low	90	168	158	200	210	92	106	91	114	93	90
Standard Special		100	187	177	220	230	100	115	100	125	100	100
Solid 56# Cyl. Kraft	High	165	184	174	350	350	135	151	127	154	103	103
	Low	125	168	158	270	270	115	129	113	136	97	86
	Ave.	150	175	165	295	295	125	140	120	145	100	95
52# W.F. Four. Kraft	High	115	172	162	250	250	82	95	142	170	107	88
	Low	105	164	154	230	230	68	85	127	150	100	79
	Ave.	110	167	157	240	240	75	90	135	160	103	83
47# Semi W.F. Four. Kraft	High	105	164	154	230	230	73	88	130	156	107	87
	Low	100	152	142	220	220	67	82	120	146	100	78
	Ave.	103	157	147	225	225	70	85	125	150	103	83
42# Dry F. Four. Kraft	High	100	156	146	220	220	71	88	132	160	100	84
	Low	85	144	134	190	190	62	76	114	133	94	74
	Ave.	95	147	137	210	210	65	80	120	145	96	77

This machine proved conclusively that high quality in the fabrication of the cases was essential if we were to overcome the troubles we had had in the past with damaged goods in both transit and warehouses.

From this date on due to the information obtained by repeated Compression Tests on this machine, compression standards were incorporated on all our container purchase specifications, after mutual agreement had been reached with our main suppliers that it was possible for them to meet these requirements.

The effect of the introduction of Compression Test Standards for all our containers was immediately noticeable in a decided falling off of complaints of damaged goods received by both outside warehouses and retailers, but we have not entirely eliminated them and will always have to consider improvement of cases by change in design, which includes style, size and direction of flutes or location and dimension of flaps.

Materials used in the manufacture of containers may also be considerably affected by the contents of the case (i.e. high or extremely low moisture content soaps) requiring possible changes to the type of liner or corrugations used in the manufacture of the cases, but none of these items affects the strength of a case so much as the quality of fabrication in the case.

The main causes of poor compression performance in corrugated cases are due to:

1. Leaning walls of the flutes (crushed or dragged).
2. High and low corrugations.
3. Poor adhesion of the flutes to the liners.
4. Spotty adhesive of flutes to the liners.
5. Wide finger lines.
6. Crushed corrugations due to poor printing operation or taping.
7. Faulty stitching.

The aforementioned faults in their respective order were the main causes of cases failing to meet our compression specification standards when we first started testing all deliveries of cases from suppliers.

A Source of Weakness

During the survey of damaged cases in warehouses and retail stores, one of the main causes of damage to our original shipping containers was due to badly scuffed and split open horizontal or vertical scores which not only exposed the contents of the containers to the elements but caused them to completely break down when stacking in piles on the warehouse floor.

At this point, and in line with this subject, I wish to call your attention to some figures recently forwarded to us by one of our leading container manufacturers.

The accompanying table indicates that where the difference lies in score line strength, kraft liners are much superior for horizontal score line strength than jute liners. But for vertical score line strength, jute liners, owing to the grain of the liner running horizontally around the case in the opposite direction to the vertical flutes, showed a decided advantage in this direction.

We have found that it is well to consider very carefully whether the sealed flaps of containers will always ride uppermost during shipment and when stacking on the warehouse floors owing to the shape of your container. In other words, apparently, the shape of your container decides whether the vertical or horizontal score lines will receive the most scuffing and strain during shipment.

Up to now no mention has been made of the use of interior packing materials for certain items to insure their perfect fitting into the case, so that all the items therein are either braced against each other, the walls of the case, or against suitable interior pads or other packing materials. It must not be overlooked that a perfect fit of the contents of the case to its interior is essential to prevent distortion during shipment, otherwise, unavoidable damage to case and contents will result with disastrous results. Care must be specially exercised in the packing of goods for export shipment.

For the buyer of small quantities of shipping containers who could not reasonably afford the installation of a compression tester, visual or manual examination of representative samples taken from a regular delivery should enable him to be reasonably sure of obtaining well fabricated cases which should give better service than those previously accepted without such examination.

Visual Inspection

Visual or manual inspection includes the careful checking over of the printing and its appearance, perfection of slotting and trimming, application of tape or stitches and depth of scoring. Dimensions should be also carefully checked and the case made up and flaps closed to determine score line accuracy and strength.

It is advisable to run the fingers lightly over the printed surface of the cases, especially where printing is the heaviest, to make sure that the corrugations have not been broken down by printing operations. If depression in the corrugations are noticeable, cut through the top liner and corrugations below with a very sharp razor blade, fold the cut portion back on itself and examine the flutes for unevenness in height. This examination should be carried out in different locations on the panels of the case as it gives sure indication of faulty construction and are the points at which the case will readily collapse under compression during shipment or storage.

THE MARKET PLACE

First - of - the - month quotations for carloads or mill shipments, with comparative prices quoted one month ago and one year ago

	Aug. 1 1939	July 1 1940	Aug. 1 1940
ACIDS			
Acetic, 28%, cwt.	2.13	2.23	2.23
Muriatic, 18 deg., cwt.	1.50	1.50	1.50
Nitric, 36 deg., cwt.	5.00	5.00	5.00
Oxalic, Works, cwt.	10.75	10.75	10.75
Phenol, Works, cwt.	14.25	14.25	14.25
Sulphuric, 66 deg., ton	16.50	16.50	16.50

BUILDING MATERIALS			
Brick, N. Y. dock, per M.	12.50	12.50	12.50
Cement, f.o.b. plant, bbl.	2.15	2.15	2.15
Glass, single B, per box	2.70	2.70	2.70
Lime, per bbl.	2.16	2.85	2.85
Nails, wire, per keg	2.45	2.55	2.55
Oak flooring, per M. ft.	69.00	72.00	72.00
Southern pine, K.C., per M. ft.	22.20	22.93	22.80 ↓
CHEMICALS			
Alcohol, denatured, gal.	.27½	.31½	.31½
Alum, potash, cwt.	3.40	3.75	3.75
Alumina Sulf., Comm., Works, cwt.	1.15	1.15	1.15
Ammonia, aqua, 26 deg., drums	.02	.02¼	.02¼
Arsenic			
White, cwt.	3.00	3.00	3.00
Red, cwt.	15.75	18.00	18.00
Barium			
Chloride, ton	77.00	77.00	77.00
Carbonate, ton	56.50	56.50	56.50
Benzol, pure, gal.	.16	.16	.16
Borax, powd., ton	48.00	48.00	48.00
Chlorine, cwt.	1.75	1.75	1.75
Formaldehyde, lb.	.05¼	.05¼	.05¼
Glycerine, drums, lb.	.12½	.12½	.12½
Lead acetate, white, broken, cwt.	10.00	11.00	11.00
Nickel sulphate			
Double	.13	.13	.13
Single	.13	.13	.13
Potash			
Caustic, solid	.06¼	.06¼	.06¼
Permanganate	.18½	.18½	.18½
Sal Ammoniac			
Gran, white, cwt.	4.50	4.50	4.50
Gran. gray, cwt.	5.75	5.75	5.75
Saltpeter crystals	.07½	.081	.081
Soda			
Ash, 58%, light, bulk, cwt.	.90	.90	.90
Caustic, 76%, solid	2.30	2.30	2.30
Sal, Works, cwt.	1.10	1.10	1.10
Sodium			
Bicarbonate, cwt.	1.70	1.70	1.70
Phosphate, cwt.	1.85	2.10	2.10
Silicate, 60 deg., cwt.	1.65	1.65	1.65
Sulphur, Comm., cwt.	2.60	2.60	2.60

COAL & COKE			
Anthracite, stove, mines	5.65	5.95	6.05 ↑
Bituminous, Cleaf, mine run	2.50	2.50	2.50
Bituminous, Pa. Grade A	2.40	2.30	2.30
Beehive Coke, Connellsville	3.75	4.35	4.35
By-product Coke, Newark	10.80	11.38	11.38
FERTILIZERS			
Muriate potash, 80-85%, per unit K20	.53½	.53½	.53½
Sulphate potash, 90-95%, bags.	36.25	36.25	36.25
Nitrate soda, bulk	27.00	27.00	27.00
Sulphate ammonia, dom. bulk	26.75	28.00	28.00
Steamed bonemeal, 3 and 50, per ton	23.50	32.50	32.50
GRAINS			
Barley, malting, bu.	.57½	.62½	.67⅝ ↑
Corn, No. 3, yellow, bu.	.43½	.64¼	.65¼ ↑
Oats, No. 2 white, bu.	.29	.35¼	.30¾ ↓
Rye, No. 2, Western, bu.	.58⅜	.56½	.61 ↑
Wheat, No. 2, hard winter, bu.	.63¼	.69¼	.66½ ↓
Flour, spring patents, 196 lbs.	4.65	4.65	4.45 ↓
HIDES			
Light native cows, lb.	.12	.12	.11¼ ↓
Heavy native steers, lb.	.12	.11¼	.10¼ ↓
Calfskins, 5-7 lbs. per skin	1.30	nom.	1.20 ↓

IRON & STEEL

	Aug. 1 1939	July 1 1940	Aug. 1 1940
Pig iron, foundry No. 2	21.00	23.00	23.00
Pig iron, basic, valley	20.50	22.50	22.50
Cast iron pipe, New York	50.00	52.50	52.20
Forging billets, Pittsburgh base	40.00	40.00	40.00
Sheet bars, Pittsburgh base	34.00	34.00	34.00
Wire rods, Pittsburgh base	43.00	40.00	40.00
Cold rolled sheets, cwt., Pittsburgh base	3.20	3.05	3.05
Hot rolled annealed sheets, cwt., Pittsburgh base	2.00	2.10	2.10
Cold rolled strips, cwt., Pittsburgh base	2.95	2.80	2.80
Hot rolled strips, cwt., Pittsburgh base	2.00	2.10	2.10
Tin plate, cwt., Pittsburgh base	5.00	5.00	5.00
Bars, cwt., Pittsburgh base	2.15	2.15	2.15
Shapes, cwt., Pittsburgh base	2.10	2.10	2.10
Bright wire, cwt., Pittsburgh base	2.60	2.60	2.60
Ground shafting, cwt., Pittsburgh base	2.70	2.65	2.65
Rails, ton, Pittsburgh base	40.00	40.00	40.00
No. 1 heavy melting scrap, ton, Pittsburgh	16.00	20.50	18.50 ↓

METALS, NON-FERROUS

Aluminum, virgin ingots	.20	.19	.18 ↓
Antimony, American, spot	.12	.14	.14
Copper			
Electrolytic	.10½	.11⅛	.11¼ ↑
Casting	.09⅞	.10¾	.113
Lake	.10½	.11½	.11½
Chromium, 97%, spot	.85	.84	.84
Lead, E. St. Louis	.049	.0485	.0485
Nickel, ingot	.35	.35	.35
Quicksilver, flask	86.00	198.00	190.00 ↓
Silver, bars, N. Y., per oz.	.34¾	.34¾	.34¾
Tin, Straits, spot	.488	.52⅝	.52⅞ ↑
Zinc, E. St. Louis	.046	.0625	.0625

METAL PRODUCTS

Copper, wire, bare, cwt.	14.125	14.875	14.875
Yellow brass sheets, high	16.65	18.56	18.56

NAVAL STORES

Turpentine, gal.	.30	.32½	.33 ↑
Rosin, Grade B, cwt.	1.93	1.61	1.80 ↑

PAINT MATERIALS

White lead, dry, basic, carbonate	.07	.07	.07
Carbon black	.03¾	.028	.03075 ↑
Shellac, orange	.09½	.14	.14
Linseed oil	.089	.098	.092 ↓

	Aug. 1 1939	July 1 1940	Aug. 1 1940

PAPER

News, roll, ton	50.00	50.00	50.00
Book, M. F., cwt.	6.00	6.25	6.40 ↑
Wrapping, northern, cwt.	4.75	5.25	5.25
Wrapping, southern, cwt.	3.50	4.25	4.25
Wrapping, manila jute, cwt.	7.75	8.25	8.25
Chip board, No. 1, ton	30.00	40.00	37.50 ↓
Wood pulp, mech., ton	22.00	34.00	34.00
Wood pulp, sulph., No. 1, cwt.	2.00	2.62½	3.17½ ↑

PETROLEUM

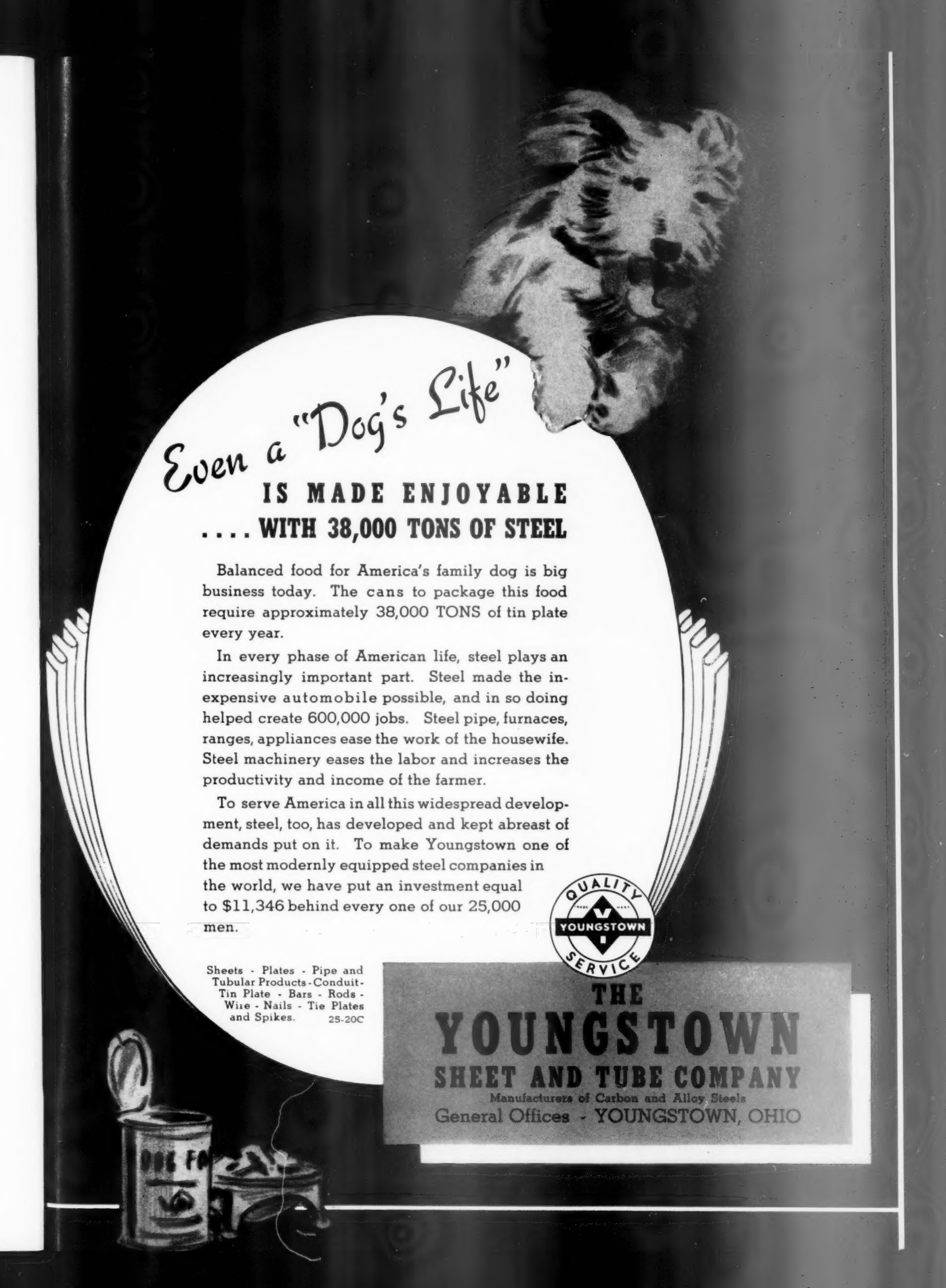
Crude, Mid-Continent	.60	1.02	1.02
Crude, Penna.	1.45	2.05	1.55 ↓
Gasoline, 65 oct.	.05¾	.05¾	.05⅜ ↓
Bunker Oil C	1.05	1.35	1.35
Kerosene, 41-43 grav.	.04¾	.054	.051 ↓
Penn. bright stock, light, 25 P.T.	.15¼	.25	.22 ↓
Penn. cylinder oil, 600 flash	.10½	.20	.18½ ↓

RUBBER

Smoked sheets	.16½	.21	.22 ↑

TEXTILES

Cotton middlings, Galveston	.091	.1024	.0956 ↓
Cotton yarns, 22s	.22½	.23½	.23½
Print cloths, 38½", 64x60	.04¾	.04¾	.04¾
Sheeting, 37", 48x48	.05	.05⅛	.05⅛
Wool, fine combing, ½-blood	.66	.86	.84 ↓
Worsted yarns, French 2-40s	1.50	1.80	1.77½ ↓
Worsted yarns, English 2-40s	1.37½	1.60	1.60
Silk, Japan, double extra cracks	2.63	2.65	2.53 ↓
Rayon, viscose, 150, 40s	.51	.53	.53
Burlap, 10½-oz., 40"	.0545	.074	.0725 ↓
Hemp, Manila	.05¼	.05¾	.05⅞ ↑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Among the ASSOCIATIONS

NEW OFFICERS AT CANTON

W. C. Hollinger of the Canton Hardware Co., has been elected President of the *Canton & Eastern Ohio Association*, succeeding John F. Buchman, Jr., of the Frankham Brass & Bronze Co., who becomes National Director. Other officers for 1940-1941 are: A. J. Burns of the Bonnot Co., *Vice President*, and C. L. Witter of Reserve Printing Co., *Secretary-Treasurer*.

ERIE BUYERS ELECT

Frank C. Baumeister of Eureka Electric Products Co., was re-elected President of the *Erie Association* for the coming year, and John W. Cooke was reelected as Secretary. Other officers chosen were: *Vice Presidents*, James P. Condon of Erie City Iron Works and Richard A. Amy of Perry Furnace Co.; *Treasurer*, Roy G. Zahner of Northern Electric Equipment Co.

CINCINNATI OFFICERS

The *Cincinnati Association* has elected the following officers for 1940-1941: *President*, George De Silver of Pickering Hardware Co.; *Vice Presidents*, James Fath of Estate Stove Co., and Lawrence Werner of Cincinnati Chemical Co.; *Secretary*, Edward Cordes of the E. Kahn's Sons Co.; *Treasurer*, Robert Durler of Cincinnati Milling Machine Co.; *National Director*, Wilbur Muchmore of Frank F. Taylor Co.; *Trustee*, Bernard Toerner of Mutual Manufacturing & Supply Co.

NEW OFFICERS AT TOLEDO

Officers of the *Toledo Association* for the coming year are as follows: *President*, J. P. Meyer of Hixon Peterson Lumber Co.; *Vice Presidents*, R. W. Witchner of De Vilbiss Co., and Ed Warner of Doehler Die Casting Co.; *Secretary-Treasurer*, W. J. Todd of City Auto Stamping Co.; *National Director*, J. C. Diehl of Libbey Owens Ford Glass Co.; *Directors*, Eric Suthoff of Spicer Mfg. Co., Gordon Yost of Toledo Scale Mfg. Co., Henry Poll of H. Poll Electric Co., T. E. Dimke of Leland Electric Co., G. L. Kibler of A. Bentley Sons Co., and John Frautschi of Bunting Brass & Bronze Co.

LEHIGH VALLEY OFFICERS

J. A. Nork of the Fuller Co., Catasauqua, has been elected president of the *Lehigh Valley Association* for 1940-1941, succeeding I. L. Rush of Victor Balata & Textile Belting Co., Easton, who becomes National Director. Other officers for the coming year are: *Vice President*, T. C. Neil of Allentown; *Secretary*, Joseph Carcione of Easton; *Treasurer*, E. H. Wieder of Allentown; *Directors*, C. W. Rubow of East Stroudsburg, G. M. Overfield and G. A. Hildenberger of Bethlehem, R. T. McClarin of Allentown, C. R. Fehnel of Nazareth, and J. H. Barr of Phillipsburg.

MONTREAL UNDERTAKES TO SUPPLY AMBULANCE

The *Montreal Association*, in a desire to make a tangible contribution to the cause of Canada and the Empire, has undertaken to supply the Canadian Red Cross Society with a four stretcher ambulance, at an estimated cost of $1,750.

MORE PRODUCTION WITH "GUN" TAPS

• When an eastern aircraft manufacturer needed a 10-32 thread through these long brass barrels, "Gun" Taps were chosen. Why? Because tests proved that *"Gun"* Taps had the combined accuracy and stamina to meet the stringent requirements of the job. Special long shank ground thread *"Gun"* Taps churn through at the rate of 550 R.P.M. and turn out two finished jobs every minute. The average production is 6,000 parts per tap — with 1,000 between grinds.

• Has your plant a tough job —in brass, bronze, iron, steel, plastic or fiber? Ask for suggestions from *"Greenfield"* engineers.

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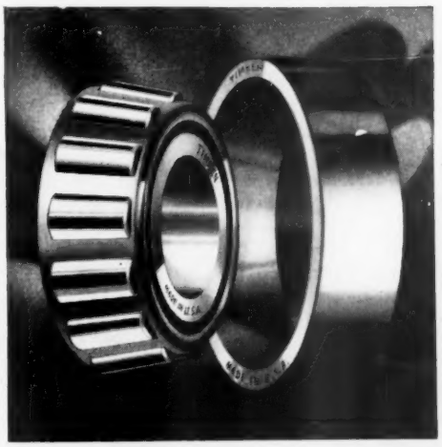

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Timken has successfully applied bearings to every kind of mechanical equipment. It takes several years to thoroughly prove the successful use of bearings in meeting the individual specialized problems of any given condition of service. Timken's vast fund of experience takes the guesswork out of bearing application.

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W. B. Osler of Harrison Brothers, Ltd., is chairman of the committee in charge of the project.

JULY 9

TRION, GA—Plant visit of the *Chattanooga Association*, at the Trion Mfg. Co. The all day program included inspection of the plant and dairy units, and luncheon at the Riegeldale Tavern.

JULY 11

BIRMINGHAM—Luncheon meeting of the *Birmingham Association*, at the Redmont Hotel. Speaker: C. E. Armstrong, City Comptroller, "What Becomes of Your Tax Money."

COATESVILLE, PA.— Plant visit of the *Philadelphia Association*, at the Coatesville Plate Washer Co., and golf outing at the Coatesville Country Club.

JULY 12

PORTLAND—Luncheon meeting of the *Oregon Association*, at the Mallory Hotel. Report on the N.A.P.A. convention proceedings, by Ross B. Cooper, National Director.

LOUISVILLE—Annual boat excursion of the *Louisville Association*, on the *Eleanor T*, as guests of Edward J. Theobald. A stop was made for swimming and dinner at Twelve Mile Island, and a business session was held on board.

JULY 17

ERIE—Ninth annual picnic of the *Erie Association*, at Moreland Park. J. P. Condon was general chairman of the committee in charge, assisted by R. A. Amy, F. C. Baumeister, J. W. Cooke, F. J. Kuhn, M. F. Ludwig, J. F. Roehl, C. W. Yartz, and R. G. Zahner.

SYRACUSE—Annual summer party of the *Syracuse & Central New York Association*, at Bellevue Country Club. Golf, sports, and banquet.

JULY 18

ROCKFORD—Plant visit at the National Lock Company. The *Rock River Valley Association* was host to members of the *Chicago, Milwaukee and Tri City Associations* for the day. Luncheon was served at the National Lock Co. following the trip through the plant. The afternoon was devoted to golf and swimming, and there was a dinner meeting in the evening.

TOLEDO—Annual golf tournament of the *Toledo Association*, at the Highland Meadow Club. The committee included Walter Todd, Bert Pim, G. L. Kibler, J. Lowell Cauffiel, F. J. Trout, T. E. Dimke, Ed Warner, A. J. Goetz, and Gordon Yost.

JULY 20

BIRMINGHAM—Annual picnic of the *Birmingham Association*, at Pineview Beach. Swimming, sports, and dinner. Lee Allen Brooks was in charge of the arrangements.

SEATTLE—Nineteenth annual family picnic of the *Washington Association*, at Alexander's Beach on Lake Sammamish.

JULY 22

DETROIT—Twentieth Annual Moonlight Excursion of the *Detroit Association* on the Steamer *Put-In-Bay*. The usual excellent program of music, contests, prizes, dancing, and entertainment was enjoyed by a near-record attendance.

JULY 23

MILWAUKEE — Informal luncheon meeting of the *Milwaukee Association*, at the Elks Club. This was the first of two summer meetings scheduled for the exchange of opinions on business conditions and commodity trends in the present state of general uncertainty.

JULY 24

BUFFALO—Annual family outing of the *Buffalo Association*, at the Buffalo Automobile Club, in Clarence. Games, dinner, and dancing. Edward J. Butler was general chairman of the committee in charge, Russel A. Sharp, honorary chairman, and Charles T. Boldt, vice chairman. Others on the committee

You Get Exactly What You Pay For!

"Why do you charge 5 cents a glass for your lemonade when the other boy charges only 2 cents?" asked Mr. Sharp, as he sipped his second glass.

"*The cat fell in his,*" answered Truthful Tommy.

* * *

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were Thomas R. Beecher, John C. Newton, Frank G. Kager, J. A. Frank Neal, and Frank Meier.

JULY 25

CLEVELAND — Twenty-third Annual Picnic of the *Cleveland Association,* at Nela Park. Games, entertainment, swimming, dinner, favors, and dancing. Barney Bergquist was chairman of the committee in charge.

BIRMINGHAM—Luncheon meeting of the *Birmingham Association,* at the Redmont Hotel. Speaker: John Sutter of the Owens-Illinois Glass Co., "Insulux Glass Blocks." Mr. Sutter's talk was illustrated with motion pictures.

HOPKINS IS CITY P. A. AT KANSAS CITY

Roscoe C. Hopkins has been appointed City Purchasing Agent at Kansas City, Mo., according to an announcement by Horace R. McMorris, Director of Finance. As reported last month, Mr. Hopkins became acting P. A. upon the resignation of R. H. Van Ness, and the appointment has now been confirmed. He was formerly Purchasing Agent for Menorah Hospital, and has for many years served as secretary of the Kansas City Purchasing Agents Association.

G. R. Slocum, formerly Purchasing Agent for the Loose-Wiles Biscuit Co., has been named as Mr. Hopkins' assistant.

WAR HELPS TO CREATE NEW U. S. INDUSTRIES

According to data compiled by Harold C. Rushmore, Purchasing Agent of the International Textbook Co. and International Correspondence Schools, the war in Europe is already beginning to create new industries in the United States.

"The wartime development of industry in this country is by no means confined to the production of munitions, planes, and other war supplies," he says. "Those things are temporary. But the shutting off of supplies from abroad has brought about the development of industries for the production of many things we formerly imported. The production of these things in the United States may well continue after the war is over."

Imports of drawing instruments, formerly received in large quantities from Germany and Switzerland, have virtually stopped, and as a result, a company has been organized in New Jersey to manufacture them.

Diamonds, essential to the operation of many industries, were cut for the most part in Holland and Belgium. Since the invasion of those countries there has been a marked increase in the cutting of diamonds in New York.

Mr. Rushmore predicts that American industry will solve the problems presented by shortages of raw materials such as rubber, silk and tin, as well as manufactured products.

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Cooperative Buying for Governmental Units

THE Central Board of Purchases, City of Milwaukee, has taken steps to coordinate the buying of independent boards and commissions, as well as the Milwaukee County Board, through a plan of voluntary cooperation. The project follows in general outline the highly successful experience of the City of Cincinnati and Hamilton County, where purchases of several items for these two governmental units, the University of Cincinnati, the public schools and the public library have been coordinated to good effect.

A number of conferences have been held with representatives of the buying agencies in the Milwaukee area, and wholehearted cooperation is assured. There will be no attempt to create new legislation setting up a metropolitan purchasing board, but a plan has been set up for frequent conferences looking toward an enlargement of the scope of the voluntary cooperative purchasing work that has for some time been carried on through the City Board of Purchases. Later on it is contemplated that the suburbs will be invited to join in the plan, giving still larger opportunities to realize additional economies. Joseph W. Nicholson is City Purchasing Agent and the initiator of the project.

At the same time comes news of a similar undertaking by the City of Newark and Essex County, N. J. The approach in this case is somewhat different, and is being worked out by planning to have the city and county purchasing departments advertise for bids on comparable items on the same day, so that there will be a direct comparison of bids available. It has already been put into effect on certain food supplies, and although some disparity in bids was found, the results were generally considered encouraging. While there is no effort to consolidate the volume of purchases, the tendency is to bring quotations more nearly in line than has been the case in the past.

A conference was held in the latter part of June, attended by Freeholder Burnett, County Purchasing Agent George C. Bergen, City Commissioner Byrne, City Purchasing Agent Salvatore Bontempo, and Samuel Gaiser of the Board of Education. It was agreed that all public units doing purchasing could join in the move, and it is expected that several other independent boards may take advantage of the opportunity. At the present writing, the Board of Education has not made a definite commitment.

The step is seen as a possible forerunner of centralized purchasing, but for the present actual centralization is not an issue since the law holds each of the purchasing groups responsible for its own buying. Voluntary cooperation for mutual benefit is the sole basis of operation and the sole objective for the time being.

The conditions leading to this extension of coordinated buying are by no means peculiar to the areas mentioned above. Within the past month it has been disclosed, for example, that the same supplier charges the City of Detroit 65 cents a gallon for ice cream for the park refectories, and charges the Board of Education 73 cents a gallon for its school lunch room requirements. Similarly, one bakery offers 10-inch pies to the Board of Education at 27 cents, but charges the City 30 cents for 9-inch pies. These discrepancies are now the subject of an investigation by Purchasing Commissioner Edward H. Kennedy, Jr., on orders by Mayor Jeffries. At the same time the Mayor has refused to approve proceedings of the School Board meeting at which contracts were awarded contrary to the recommendation of a special committee including Purchasing Agent William Collins and Lunch Room Director Lawson A. Wiles. Coordination of purchasing among the several departments of the City government would be the first step toward the correction of such situations.

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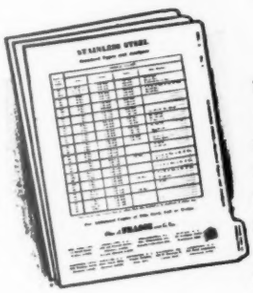

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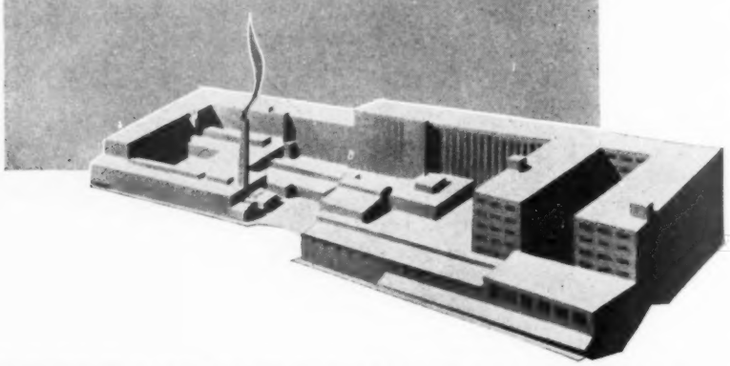
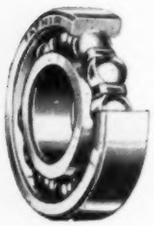


COMPLETE PLANT FACILITIES



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COTTON ACREAGE

The July estimates of the Crop Reporting Board, U. S. Agricultural Marketing Service, shows 25,077,000 acres planted to cotton and under cultivation for the current season. This is up slightly from the corresponding figures for the past two years, comparing with 24,943,000 acres in 1939 and 25,018,000 acres in 1938. With these two exceptions, however, the acreage this season is the smallest since 1900. The report was closely in line with general trade expectations.

On the basis of average abandonment over a period of ten years, and calculating the crop by states, based on the five-year average yields per acre, 1935 to 1939 inclusive, the New York Cotton Exchange Service appraises the prospective crop as 11,765,000 bales. During the last crop year, a total of 11,600,000 bales were harvested.

Domestic consumption of cotton over the past year amounted to 7,600,000 bales, the largest figure on record except for the year 1936-1937, when domestic users absorbed 7,950,000 bales. In addition to this high consumption figure, more than 6,000,000 bales were exported during the past crop year, so that heavy inroads, totalling some 2,000,000 bales, were made into stocks on hand, both government held and those in private hands.

Continued heavy use is anticipated during the year ahead, but it is estimated that a sharp curtailment in exports due to war conditions may cut our foreign outlet by as much as one-half. In that event there would be 8,765,000 bales left for domestic consumption, and it is not regarded as likely that this figure will be attained, even with the impetus of the armament program. Crop failure, or an early end to foreign hostilities, would of course alter the outlook materially. At the present time, however, a considerable surplus is in prospect.

PASSAIC SAVES ON SCHOOL PURCHASES

After three months of operation under a system of centralized purchasing, the Passaic Board of Education estimates that savings of $4,000 have already been effected in the purchase of school supplies, and surplus inventories have been substantially reduced. Miss Katherine M. Young is Purchasing Agent, reporting to Harry H. Vanderberg, chairman of the business and finance committee of the Board.

Miss Young has been an employee of the Board of Education twenty-three years. After attending a convention of Public School Business Officials in Cincinnati last year, she recommended the establishment of centralized purchasing for school supplies, and was given the assignment of such a plan into effect last March.

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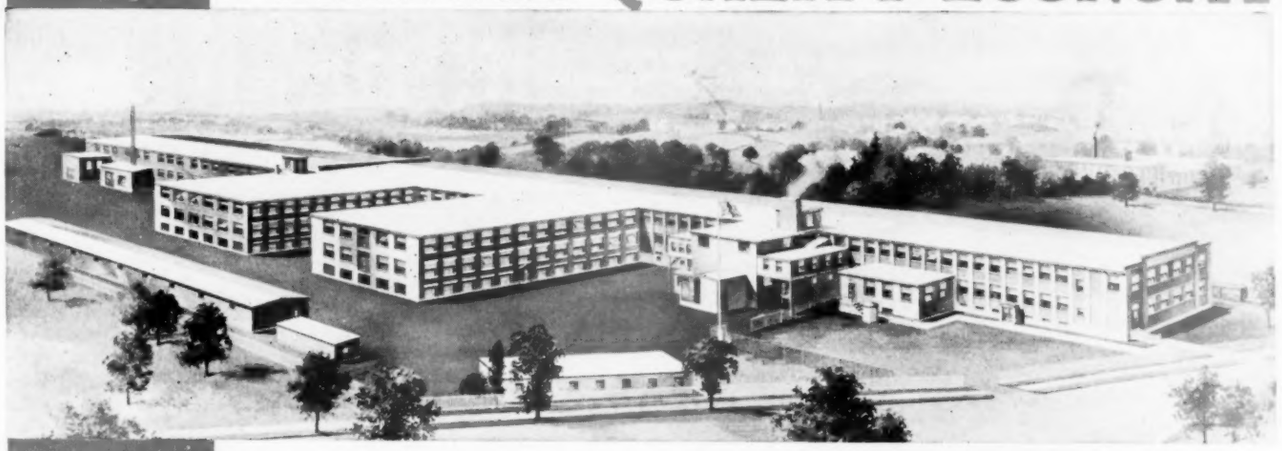

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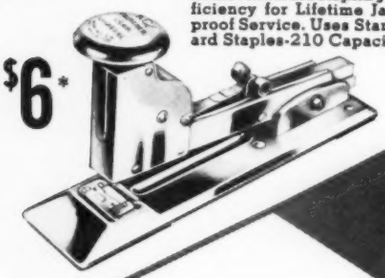

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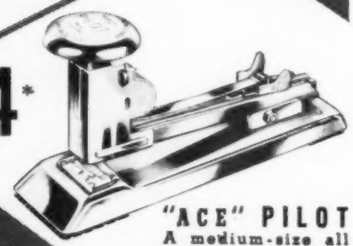

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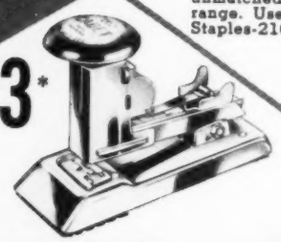

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Buyer's BOOKSHELF

ACCOUNTING FOR GOVERNMENT-OWNED MOTOR EQUIPMENT; ACCOUNTING FOR GOVERNMENTAL SUPPLIES—These two new publications of the Municipal Finance Officers Association, identified as Accounting Publication No. 6 and No. 7 respectively, have been compiled primarily from the accountant's standpoint, being part of a series covering accounting procedures for public property, inventories, payrolls, debt, taxes, and budgets. They are nevertheless of direct interest to purchasing officers, who are generally charged with the procurement of such equipment and supplies, who are seeking ultimate values through the records of maintenance and operating expense, and whose responsibility includes the control and handling of stores.

The booklet on motor equipment considers four types of administrative policy, ranging from the case in which each separate department has complete responsibility for its equipment service and maintenance, to the completely centralized transportative service serving all departments. Each of these presents some special problems in getting a proper accounting picture.

Of special interest to the Purchasing Agent who requires accurate and complete data on performance and expense are the sections dealing with Equipment Records (including individual equipment record, equipment history record, and the monthly summary of expenses); Procedures for Recording Equipment Expenses (including gasoline, oil and alcohol; tires, other supplies, and repair parts; repair labor, outside repairs, insurance, and depreciation); Equipment Operating Data; Tire and Battery Records; and Budgeting Equipment Service. The suggested procedures are illustrated with fifteen specimen forms covering the essential working records and summaries, and providing for a complete correlation of expenses, performance, and accounts.

The booklet on stores accounting recognizes the fact that much attention has been given to the control of government cash expenditures and balances, but that the equally important balances of materials and supplies, which are subject to serious losses through waste, theft and obsolescence, have frequently been neglected. The problem is attacked from the standpoint of controls established by proper accounting methods.

The controls necessarily cover the entire course of materials and supplies from their receipt to the issue, return, or use. The plan starts with a consideration of the storage facilities and the basic records of the stores ledger and the perpetual inventory, including central stores and materials in sub-storerooms. Procedure includes the receiving report (copy of the purchase order) and partial deliveries; requisition and issue; unit costs; classification of stores; determination of maximum and minimum stock quantities; inspection; control of inventories on construction jobs, roving maintenance trucks, tools and small equipment, fuel and gasoline; taking the physical inventory; salvage; disposal of surplus and obsolete items; inventory losses and adjustments; besides matters of a strictly accounting nature relative to these operations and records. There is also a section on stores reports, including an operating analysis, report on the condition of the inventory, and on the financial condition of the working capital fund.

Illustrating the various procedures are specimen forms for the stores ledger, perpetual inventory record, purchase order copy used as receiving report, stores requisition, request for purchase, inspection report, daily tool record and monthly coal report, various inventory record forms, operating analysis sheet, and a flow chart tracing the receipt, issue and return of materials.

Each of the booklets consists of 60 pages and paper cover. They are published by the Municipal Finance Officers Association of the United States and Canada, 1313 East 60th St., Chicago, Ill., and are priced at fifty cents a copy.

* * *

U. S. ARMY BUYERS

The following appointments of officers in charge of field procurement offices, U. S. War Department, have been announced in connection with the defense program:

Quartermaster Corps: Major Clarence J. Blake, Second & Arsenal St., St. Louis, Mo.

Ordnance Department: Major H. M. Reedall, 935 U. S. Custom & Courthouse, St. Louis, Mo.

Air Corps: Major Ray G. Harris, Stearman Aircrafts Co., Wichita, Kansas.

Corps of Engineers: Major R. Whitaker, 1117 U. S. Postoffice Bldg., Chicago, Ill.

Medical Department: Lieut.-Col. Royal K. Stacey, Second & Arsenal St., St. Louis, Mo.

Signal Corps: Capt. Arthur E. Mickelson, 1819 West Pershing Road, Chicago, Ill.

Chemical Warfare Service: Major Harry R. Lebkicher, 1113 Postoffice Bldg., Chicago, Ill.

Local purchases for the Navy Department are centered in the Supply Officer, Naval Training Station, Great Lakes, Ill. Firms wishing to have their names placed on the mailing list to receive proposals should file their request at the above offices.

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FOUR METHODS PROPOSED FOR DEFENSE BUYING

Advice from Washington indicates that the gigantic procurement program for national defense will make use of four principal buying methods—open bidding, cost-plus contracts, negotiated orders, and fixed prices. Throughout the entire program, an effort will be made to keep the profit motive alive as an incentive to production, while seeking the fairest possible prices on government requirements. A general limitation of profits to producers on government contracts, in the neighborhood of 8%, is said to be contemplated.

According to the general plan, the practice of open bidding will be followed in the procurement of standard items. Cost-plus contracts, which are not heartily approved of in principle and which will be safeguarded by means of cost audits at stated intervals, are to be considered when special research and other unusual expenses are dominant factors. Negotiated contracts will be used where changes in plant set-up and production methods are involved.

The fourth type of purchase, to be applied, for example, in the purchase of uniforms, calls for direct contracts at prices set by the government, the usual bidding to be eliminated. On such an order it is proposed to have the Army supply the cloth, woven under contract from wool purchased by the government, manufacturers to make up the uniforms at prices stipulated by the Army.

The National Defense Commission, in conjunction with the Army and Navy, has set up a cost formula, in which the items of material and labor costs, operating overhead, and profit are worked out for each non-standard article of equipment that may be needed. It is similar in many respects to the system set up by the Canadian government since the outbreak of the war, which is working quite satisfactorily in the Dominion. It does not attempt to set up uniform prices for such equipment, as purchases and production are to be widely spread, but differences in cost due to local conditions must be justified under the formula, and the profit margin must be kept rigidly within the prescribed maximum.

In the case of the negotiated contract, a producer is called in and a price arrived at for the manufacture of the equipment, taking into consideration the adjustment of plant facilities and methods, the extent and scheduling of the order, and probable costs. This plan has been applied to the purchase of tanks and engines, the negotiations with Ford Motor Company and Packard Motor Company regarding the manufacture of Rolls-Royce engines being a case in point.

Experience with cost-plus contracts during the World War has made the government wary of such agreements as a buying policy. It is recognized, however, that in certain cases as suggested above, where research, re-equipment of plants, and other factors not wholly predictable are involved, such an arrangement may prove to be the most feasible and equitable manner of procurement. In such cases, the procedure will be to make a complete investigation of probable costs, fix the amount to be spent on salaries and on other determinable expense, and then to audit the entire cost charges at stated intervals during the life of the contract. With such supervision and control in effect, it is likely that costs will be approximately in line with the cost formula previously described.

* * *

COAL PRICE COMPLIANCE

Latest word from Washington indicates that the Bituminous Coal Division will make an effort to put minimum price schedules into effect within the next few weeks, and is pressing to complete arrangements to that end. Considerable doubt has been expressed in the trade as to whether this project, which has been hanging fire since 1937 without evidence of positive action, would ever become effective. The Act expires in 1941. There is to date little enthusiasm concerning its extension or re-enactment. A period of actual trial at this time would at least provide some factual evidence as to the practicability of the schedules which have been worked out, and the prospects of making the plan workable after previous failures and overlong delay.

The present plan, according to Director Howard A. Gray of the Bituminous Coal Division, is to make the prices effective on September 3. The initial schedules will cover more than 12,000 code members, representing upwards of 90% of national production.

Some concern is apparently felt regarding compliance on the part of producers, and in the closing week of July a conference was held at Washington, with producers and the Commission in attendance, to discuss final plans for assuring that the regulations to be promulgated will be observed in the industry and that coal will not be sold at less than the minimum prices to be established.

Producers who are members of the "bituminous coal code," thereby participating in the market regulatory plan provided by the Coal Act, may sell their coal at prices higher than the established minimum. However, they may not sell at lower prices without incurring penalties under the law.

Participation, according to the Bituminous Coal Act, is optional. Producers who elect to remain outside the code may sell their coal at any price they choose, but are subject to a special tax of 19½% on all coal sold.

"The coal industry, which has participated throughout the long and difficult task of formulating minimum prices, is continuing that cooperation in the big job of setting up practical machinery to assure that the minimum prices and marketing regulations will meet with proper compliance," Director Gray said.

"Through the producers' boards, I have sought suggestions from the coal

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Primary Products
of American Chain & Cable

ACCO TRADE MARK

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CABLE—Tru-Lay Preformed Wire Rope and Crescent Non-preformed Wire Rope
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BRAKES—Tru-Stop Brakes for Trucks & Buses
Tru-Level Oil Controller
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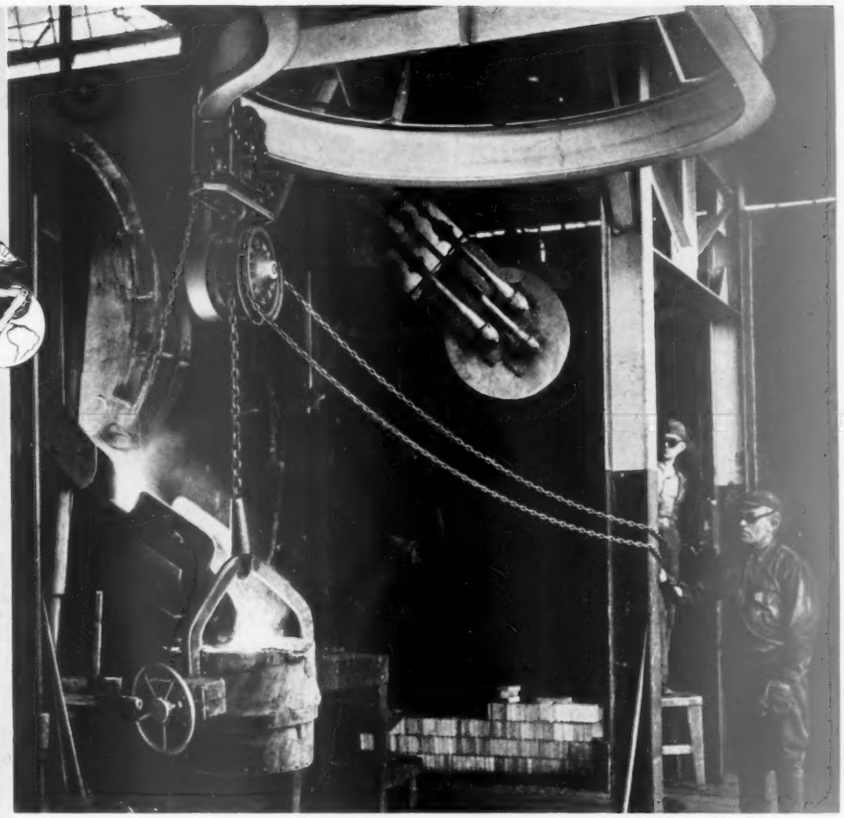
HOISTS and CRANES—Wright Chain Hoists, Electric Hoists, Cranes
WRIGHT MANUFACTURING DIVISION



...and may the WRIGHT Hoist win!

Its record proves it can and will

The gong clangs for Round 1 of the greatest industrial battle of all history. The **Wright High Speed Hoist** is ready. It is fast, powerful—trained to the minute—a seasoned, experienced winner in thousands of material-handling bouts.... Wright Hoists offer the American industrialist 21 distinct points of superiority that drive the job through with minimum effort of operators—with unfailing dependability "in the clutch"—with lowered costs first and last. ... If your production schedule counts every minute—let us give you the WRIGHT answer to your most difficult hoisting problems. The line of Wright Hoists is one of the 137 ACCO Pedigreed Products—a few of which are listed at the left.

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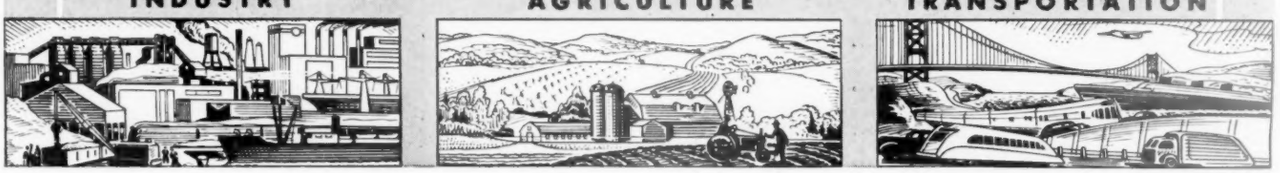

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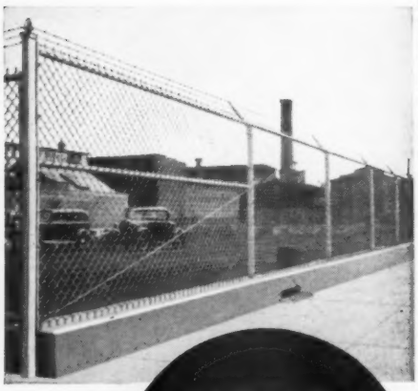

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Resists FORCE, ALWAYS STAYS IN LINE, QUICKLY INSTALLED

Wise executives today are profiting from the experience gained during a similar war period 25 years ago, and are protecting their plants against sabotage, trespassers, trouble-makers with rugged, sturdy Anchor Fences.

Anchor Fences protect plants from costly interruptions to production schedules; keep profits from being wiped out. Give your plant adequate protection—by installing Anchor Fence, by adding sections at strategic points or by extending your fencing to protect new additions to your plant. In case of future plant expansion, Anchor Fence can easily be moved to new locations to provide necessary protection there.

Anchor's Nation-Wide Erecting Service is prepared to install your Anchor Fence immediately. Send for the Anchor Fence Engineer today. He will recommend the proper Anchor Fence installation to completely protect your plant, and show you the many Anchor features which give you extra protection and longer life. Or mail the coupon now for free Industrial Fence Catalog.

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industry on how the compliance program should be operated. The boards have responded. Now we shall sit down with the representatives of the industry and go over these suggestions, together with the division's contemplated plans, and weld a sensible and satisfactory procedure."

The representatives of the industry who will confer with division officials on compliance were designated by the Bituminous Coal Producers' Boards' conference committee. This committee was created by the respective producers' boards as a central body for co-operation with the Government on questions pertaining to the Coal Act. The boards are elected by the individual "code member" producers for participation in administration of the Coal Act.

The representatives are as follows: Ezra Van Horn, Cleveland, chairman of producers' board for District 4, Ohio; J. R. Henderson, Chicago, secretary of the producers' board for District 4, Ohio; J. R. Henderson, Chicago, secretary of the producers' board for District 10, Illinois; Walter A. Jones, Altoona, secretary of the producers' board for District 1, central Pennsylvania and part of Maryland and West Virginia; J. Norval Terrio, Washington, secretary of the producers' board for District 6, West Virginia, "Panhandle"; and A. L. Vogl, Denver, counsel for the producers' board for District 16, western and southern Colorado.

The mines producing from 90 to 95% of the nation's commercial coal will be included in the first price schedules to be promulgated. As about 1,800 additional, but very small, producers who became code members too late to be included in the first schedules will be included in supplemental price schedules to be promulgated at a later date, substantially all of the nation's coal production ultimately will come under Government-established minimum prices and marketing regulations.

Under the Coal Act, minimum prices and marketing regulations are designed to maintain a "cost floor" beneath the usually "below cost" market prices for coal and to prevent the trade practices which Congress found unfair. These prices and regulations will cover only sales at the mine by code members. The relatively few remaining active producers who are not code members may sell at any prices they choose, but subject to a 19½% tax.

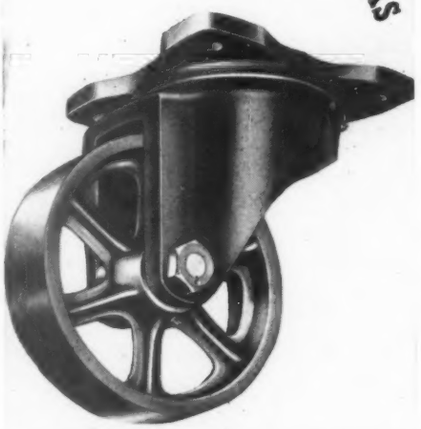
The prices and regulations do not apply to sales by retail coal dealers, except that code members must charge the dealers not less than the established prices when dealers buy their coal.

Congress found that stabilization of the coal industry was necessary to the welfare of the country. Bituminous coal, vital to national defense as the source of approximately three-fourths of the nation's total industrial power requirements, is produced in approximately thirty States. Directly and indirectly, it gives employment to more than 1,000,000 workers.

Bassick CASTERS

FROM TEA TABLES TO TEN TON TRUCKS

THERE ARE SIZES AND TYPES OF BASSICK CASTERS FOR EVERY NEED



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BECAUSE—You buy the product of the largest manufacturer—and the leader in the caster business.

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BECAUSE—You buy the economy of quantity production.

Bassick distributors are conveniently located for prompt delivery, and factory representatives are at your service. Just call or write.

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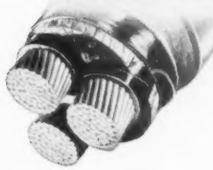

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QUICK SHIPMENT

Prompt Service is available at all offices and warehouse points listed below, where large stocks of a wide variety of standard Roebling Wires and Cables are always on hand. Your request for information, prices or samples will be welcomed.

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TRENTON, N.J.
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IF IT'S ELECTRICAL WIRE OR CABLE **ROEBLING** HAS IT!

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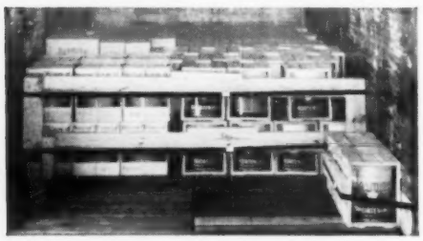
PRICE SAVINGS ARE OFTEN LOST —WHEN RECEIVING COSTS ARE *HIGH*

● The low bid can make competitive bids look bad! But if the shipment is difficult to handle—hard to unpack and distribute, excess receiving room costs may wipe out the price advantage. The low bid may turn out to be a lot higher than that of another supplier whose shipments could be more easily and economically handled.

ACME *Unit-Load* ASSURES *Easy and Economical Handling*



Shipments braced with Acme Unit-Load bands assure minimum receiving costs. Unloading is easier, faster and more economical. It takes only one snip of each strap to remove the lading easily and quickly. When you insist on shipments braced with Acme Unit-Load bands, your receiving room costs will be reduced to a minimum. The supplier, too, benefits as his shipping and handling costs are lower.

GET THE FACTS ON ACME STRAP PURCHASE PLAN

By purchasing Steelstrap and Unit-Load bands on the Acme Strap Buying Plan, you can effect important economies. The coupon below will bring you full information. No obligation.

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☐ Furnish complete information on the Acme Strap Purchase Plan.
☐ Mail a copy of "Stopping Profit Leaks," the story of the advantages of Acme Steelstrap.

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COOPERATIVE FARM BUYING

A significant trend in the farmer cooperative movement is the increasing importance of supply purchasing associations, according to M. C. Allen of the Massachusetts Farm Bureau Purchasing Department. Twenty-five years ago, purchasing constituted less than 2% of the total cooperative business, and now it is approaching 15%. In that state, the purchasing department, an outgrowth of the direct Farm Bureau service to its members, has for the past ten years done a volume of business ranging from $800,000 to $1,000,000, and has effected substantial savings. An inventory of $50,000 worth of materials is maintained among the warehouses at Waltham, Weymouth, Lowell and Worcester.

LUMBER SUPPLIES AMPLE

Whenever the national defense program calls for larger supplies of lumber, the industry is ready to expand production and shipments substantially to meet that need. Operations are currently at about 70% of capacity, and such a development is expected to produce no bottlenecks in the industry.

The defense program will absorb large amounts of lumber for barracks and other military structures, as well as for smaller miscellaneous uses. The expected boom in industrial construction that is being stimulated by armament will also produce larger demands for lumber products.

Furniture manufacturers expect production in the second half of 1940 to run 10 to 15% ahead of the final six months of 1939.

The effect of conscription upon new residential construction is problematical, so long as the draft is restricted to unmarried persons, but no great change is anticipated in the trend.

WALTERS APPOINTED

Clarence M. Walters has been appointed Manager of the Purchasing Department for Libby, McNeill & Libby, Chicago, succeeding the late C. D. Darragh.

A TWO MILLION DOLLAR PROBLEM OF SALVAGE

(Continued from page 36)

other general classifications. Later on a more general circularization will be employed. Meanwhile, firms and organizations will be placed on the list to receive current information by making application to the Director of Purchase, New York World's Fair 1940, Inc., at the Administration Building, World's Fair, N. Y.

No preferred lists or priority will be established. Appreciative of the thoroughgoing cooperation extended by the City of New York from the very beginning, and recognizing that the City is perhaps the No. 1 prospect for much of the surplus equipment, due to the common nature of many requirements, nevertheless City bids must stand up against competitive offers in this liquidating operation. There have already been a number of requests from individuals, chiefly from Fair employees who for sentimental or other reasons wish to secure the desks or equipment at which they have been working. While these are considered, along with any other offer, individual bids are not encouraged for the dual reason that mass disposition is the first objective, and that the mere mechanics of accounting for and removing individual items of this nature is an expensive and complicating procedure.

Suppliers of the original equipment are being contacted in every case as a logical outlet, regardless of whether a repurchase agreement has actually been made, and they are being given the opportunity of thus reclaiming their own used product. Conversely, since the repurchase agreements do not constitute an actual contract of sale, but represent a commitment that can be invoked at the pleasure of the Fair, materials so covered are being offered generally before the agreement is made effective, in order that the possibility of greater returns may not be overlooked.

Altogether, the disposition of this vast quantity of material, which will become obsolete for its present purpose overnight and which must be moved quickly to meet a contract deadline, looms as large in its way as did the original purchase operation which got under way a little more than four years ago. It completes the cycle of a temporary enterprise in which materials and supplies played an essential part in giving reality to the dreams and plans of the designers, and in which an orderly time schedule has always been of primary importance. It has made purchasing history, and will be a significant experience even after the towers have been razed and the lights have been dimmed for the last time. The successful completion of this liquidation will be a tribute to far-sighted and well planned purchasing.

MULTIPLEX DISPLAY FIXTURE FOR SALE

A #63 Floor type revolving Multiplex Display Fixture with a ten wing capacity, complete with 10 wings 24" wide by 36" high, 1" beveled moulding frames, fillers of thumbtack board covered with brown burlap.
Entire fixture finished in crinkle antique bronze.
Complete with shipping case. Ideal for convention exhibits or in office for display of advertising material, maps, charts. In excellent condition.

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PURCHASING
205 E. 42 St. New York, N. Y.

Obituary

Edward J. Flaherty, 50, Purchasing Agent for the D. B. Dodson Coal Co., Pottsville, Pa., died June 23rd at Jefferson Hospital, Philadelphia, following an operation.

Charles C. Warne, 58, General Purchasing Agent for the New York Central System, died in St. John's Hospital, Yonkers, July 6th, after a brief illness. He was a graduate of the University of Pittsburgh, in mechanical engineering, and had been associated with the railroad for thirty-five years.

Albert C. Brandt, 66, Purchasing Agent for the Trailer Co. of America, Cincinnati, died July 10th after a short illness. He had been with the company forty-three years.

Charles Frederick Kalle, 56, for the past thirty-eight years a Purchasing Agent for the American Tobacco Company, died at his home in New York City, July 10th, after a brief illness.

Wallace Johnson, 38, Purchasing Agent and Assistant Secretary of the Cadillac (Mich.) Malleable Iron Co., died at the Mercy Hospital in that city July 20th, following a protracted illness. He had been with the company since 1922, and was active in civic affairs, serving on the Board of Education.

USE OF COAL CARS LIMITED AT MINES

Although there is currently no shortage of coal cars, and none is expected despite a substantially higher rate of loading than in 1939, steps have been taken to conserve transportation capacities to meet any demands which may develop in connection with the national defense program. The Car Service Division of the Association of American Railroads last month announced that the use of open top cars would be restricted to the purpose for which they are designed, that is, the movement of freight. The ruling is directed at the use of cars for coal storage at the mines—the so-called "no-bill" coal loads. It was estimated that on July 1st, more than 41,000 cars were being held at mines, loaded with coal and unconsigned. The Association declared that this represents an avoidable waste of potential transportation capacity. Effective July 15th, no cars were to be placed for loading at mines where more than one day's supply was already being held under load and unconsigned.

PURCHASING PLACED UNDER CIVIL SERVICE

The position of County Purchasing Agent and purchasing department stenographer in Mahoning County, Ohio, have been placed under state civil service. Ralph Dowell, present incumbent of the purchasing post, has been nominated for non-competitive appointment as Purchasing Agent, and similar action has been taken in behalf of Miss Martha Raegan, stenographer.

Memo to Purchasing Agents

Those in your organization who are responsible for design and production will be glad to know that Richardson maintains departments of design, research and engineering to assist them in the application of plastics to present or contemplated products. Using this service involves no obligation. Furthermore, the sure way to effect sharp manufacturing economies in time and labor is . . .

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INSUROK

Molded and Laminated Plastics

The RICHARDSON COMPANY

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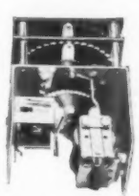
Photo Courtesy RCA Mfg. Co., Inc.

Guardian Goes On Record For . . . "IMAGINATION"

★ Ever drop a coin in an automatic phonograph? Chances are 9 out of 10 you have—and chances are that Guardian Electric controls helped "size-up" that nickel, dime or quarter—making sure the coin was good—that all records of your choice came up to play, however scattered your selection. But, that was fairly simple.

Imagine 20 separate record selectors scattered now at different points, with groups of people dropping nickels, dimes, quarters—choosing the same or different records simultaneously—still getting everything they want and pay for. Beginning to sound like music to your ears Mr. Product Engineer?



Type-R Stepping Relay

RELAYS by GUARDIAN

Applied to the automatic phonograph industry, Relays by Guardian helped solve this perplexing problem—not once—but in half-a-dozen different ways, each fitted to the individual manufacturer's product. Your control problem may be tougher, but chances are 99 out of 100 Guardian will solve it. Write for new catalog on your letterhead today.

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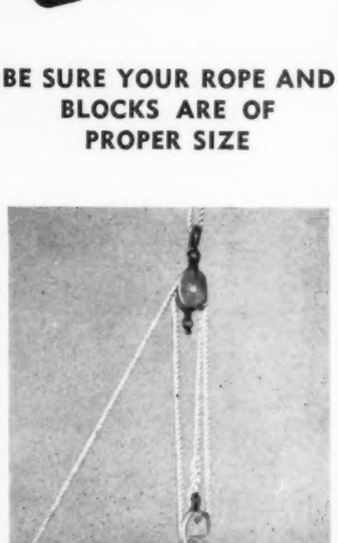
Caution

BE SURE YOUR ROPE AND BLOCKS ARE OF PROPER SIZE



To find the pull required to lift a given weight when the number of parts at the movable block is known—the weight to be lifted by the tackle divided by the number of ropes, or parts, running from the movable block will equal the necessary pull on the fall, theoretically.

But there is always a friction loss around sheaves, and a rule which is safe, but only approximate is to allow 10% friction loss for each sheave 3" dia. and larger. Add this friction loss to the load and proceed as if friction were not present.

Example:

Gun tackle—1 single and 1 double block—3 sheaves—3 supporting parts—mechanical advantage 3.
100 lbs. to be lifted.
3 × 10% = 30% friction loss.
100 lbs. + 30% × 100 lbs. = 130 lbs.

$$\frac{130 \text{ lbs.}}{3} = 43.3 \text{ lbs. pull to lift load.}$$

Other valuable facts on the proper use and care of rope, in the interest of greater safety and economy, including the Plymouth "Weight and Strength Table," are given in the new edition of our booklet—"Lift It Safely" . . . sent on request.

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North Plymouth, Massachusetts and Welland, Canada

Division Offices: New York, Chicago and San Francisco.

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EXPORT LICENSING

Conservation of both raw materials and manufactured products essential to American industry and national defense has been furthered by the program of export control which became effective last month. The program affects twenty-six basic commodities, eleven chemicals, airplane parts, equipment and accessories, armor plate, bullet-proof glass, plastics and optical elements, and machine tools. On this list of specified materials and products, licenses are required for all export shipments before they are permitted to pass through the customs, these licenses to be issued by the Control Division of the State Department.

Copies of the regulations are available through customs officials throughout the country, and complete information can be obtained from the Control Division in Washington. In general, the application for license calls for the following information:

Clear and adequate description of each item; quantity and approximate net value of the commodity; country of ultimate destination; specific purpose for which the material is required; name, address, and nationality of consignor; nature of the seller's business.

Exports of tin plate scrap are subject to special requirements. The application must detail both the consignee in foreign countries and the purchaser of the scrap; the specific character of the scrap to be exported; the number and type of containers; approximate weight and value; name and address of the producer of the scrap; specific purpose for which the material is required; nationality of the consignor in the United States; and the reason why the scrap is being exported instead of being offered for sale to the United States Government.

Unless shipments are made, from the port of exit listed in the application, within one year of the date of the license, a new application and license will be required. Export licenses must be filed with the collector of customs at the ports from which shipments leave the United States, prior to the departure. Licenses are not transferable, and are subject to revocation without notice. Licenses which have been revoked, or which have expired must be returned immediately to the Secretary of State.

Penalties for failure to comply with the licensing requirements, or rules and regulations issued thereunder, are set by the Act as $10,000 fine, imprisonment up to two years, or both. The law expires June 30, 1942, unless extended by Congress.

Standardization in the Steel Industry

(Continued from page 61)

and Bessemer practice be held to certain properly determined standards.

The circumstance that many steel products fall into the category of capital goods attaches a special significance to the standardization of their properties. Large users of steel, fabricators and manufacturers, are accustomed to draw upon more than one source of supply for their materials, often for the production of the same or identical parts. This means that the performance of steel from the different sources must be substantially uniform, or in other words, it must be produced to meet definitely prescribed standards. Drawing and machining qualities, weldability, resilience, hardenability, resistance to elongation at elevated temperatures, and electromagnetic characteristics are examples of properties which must be controlled within specified limits if market participation is to be expected. The kind of standardization necessary to provide for the conditions just described affects a wide variety of steel products, such as bars, sheets, wire, and tubing in both carbon steel and alloy grades.

Diversification tends to diminish the tonnage involved in the various items scheduled for production in the steel mill. Needless diversification and the small order walk hand in hand. Now the steel producer is not at all unappreciative of small orders, particularly when conditions are such that they may be combined and consolidated for execution at the mill. A hundred relatively small orders, if they involve only standard products without much variety, need not present a serious problem as to melting, rolling or processing. As variety increases, however, the expense of production mounts rapidly. To roll only five tons of a certain selected shape costs $8.80 more per ton than to roll one hundred tons; in another case the added costs amounts to $12.95, and in a third instance the excess is more than $15.00 per ton. Figures applying to one ton, as against one hundred, or fifty, or even five tons, are almost startling, for the additional costs alone often equal or exceed the selling prices. The customer is not at fault in this matter. It simply represents a troublesome condition which in its broader aspects can be greatly ameliorated, although not entirely cured, by an application of the principles of standardization. This presupposes a co-operative approach on the part of both consumer and producer.

It is hardly possible that standardization of products could take place without standardization of processes. That is exactly the case. The steel industry has been paying meticulous attention to its means and methods of production, all of the way from the selection of raw materials to the finishing operations on products prior to shipment. Suitable methods of chemical analysis, determination of physical properties, the setting up of rational tolerances for gauge and shape, and the development of standards for surface finish are a few of the factors which now enter, significantly, into the control of operations. Pyrometry at all important points is doing indispensable service. The application of the teachings of physical metallurgy to steel making as well as to the heat treatment of various grades of steel is systema-

tizing the procedures and making for regularity and reproducibility in the product. All of this has been matched by the ingenious mechanical devices with which the steel mills have been equipped, practically all of them electrified for precise operation and control.

Further in the interest of rational standardization, the steel industry, through the American Iron and Steel Institute, is applying organized and conscientious efforts to the task of codifying the necessary underlying information. The Technical Committee of the Institute, in collaboration with the Manufacturing Committee, is preparing a comprehensive manual which will (1) classify and define the products of the iron and steel industry, (2) collect and present data pertaining to manufacturing tolerances, (3) collect information relative to methods of inspection for each product, and (4) review existing specifications that might be considered appropriate as current standards in their respective classes. This is all in line with a policy of good housekeeping and should be effective in preparing the way for subsequent co-operative effort with the consumer.

Standardization is not an end in itself, it is fundamentally a contributor to the efficiency of industry. By serving to eliminate nonessentials it paves the way for rapid and economical production. In the present international competition for political and commercial position, a very narrow margin of superiority may be the factor which determines the swing of the balance. We in America are incorporating the principle of standardization into our industrial efforts so that when we are weighed in the national or international balance, we shall not be found wanting.

County Purchasing

(Continued from page 60)

testing and inspection facilities; 17 employ the services of commercial testing laboratories; 88 utilize the laboratory facilities of college or university laboratories for general field and laboratory tests, while 43 call upon their state highway laboratories for tests and inspection of materials and equipment used in road construction.

The purchasing process is incomplete unless goods are properly examined and tested before acceptance. This is the usual procedure in industrial purchasing as well as in efficient municipal, county and state purchasing departments. It is therefore strongly recommended that the proper testing facilities be utilized by counties to insure full value of goods purchased. It is obvious that too few counties are taking advantage of the testing facilities available, such as those of tax-supported colleges and universities and those usually maintained by the state.

In Mr. Martino's report he states: "The Federal Government is without question the largest single purchaser of goods in this country. Its purchases are made on the basis of Federal specifications of which there are over 1,250 now in use. These specifications were prepared by more than 70 committees composed of technical men selected from all branches of the government working under the general direction of Federal Specifications Executive Committee, Procurement Division, Treasury Department. The National Bureau of Standards takes an active part in the preparation of these specifications (except for foods and drugs). Considered as a whole these specifications represent the best group of commodity specifications thus far compiled. For these reasons, Federal specifications are more easily adaptable to county purchasing requirements, covering as they do, the whole gamut of public requirements and at the same time conforming to standard trade and manufacturing practices of industry. This makes it possible for the Federal Government to obtain more suitable and durable goods at fair prices."

I therefore urge that county purchasing departments make wider and more general use of Federal Government specifications.

Need for Centralization

More centralized purchasing is needed in counties. From the fact that we received only 1,777 replies out of 3,070, it is obvious that 1,893 county officials in an executive capacity ap-

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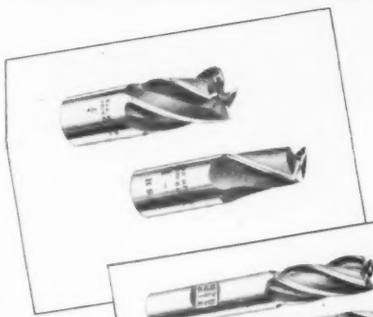

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Above, End Mills, Straight Shank Types

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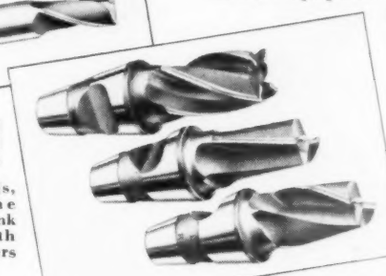
At right, End Mills, Milling Machine Standard Taper Shank Types. For use with Cam Lock Adapters



Below, End Mills, Brown & Sharpe and Morse Taper Shank Types

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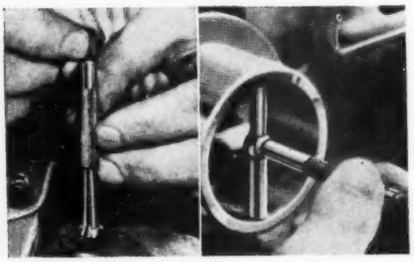
parently have no interest whatsoever in the manner in which their purchases are made or the economies which would result through the proper type of purchasing organizations. The purpose of the Governmental Committee is to shed light on this problem where it is needed, and it is believed that a wide distribution of the new pamphlet on county purchasing will tend to awaken the interest of responsible officials, civic organizations and public-minded citizens throughout the country.

You will be interested in a quotation from the New York *Herald Tribune*, issue of December 18, 1938, regarding a year's experience of Nassau County, New York, under its new charter. I quote, "Briefly, the new charter provided for the centralization of many administrative functions, previously left to local units, in the county government. The latter instead of consisting merely of a board of supervisors representing the towns and cities, the usual form of county organization, has a full-time county executive with broad powers, assisted by the supervisors in a legislative capacity. The reorganization was intended to achieve greater efficiency and economy ****. An important accomplishment under the new charter *** was the centralization of fiscal control in the hands of the county executive. Formerly every county department could apply and reapply for additional appropriations. Now each department must set up its budget a year in advance. This is submitted to the executive, who, in consultation with the department head, removes all unnecessary items. The appropriation is divided into four parts, and the department heads undertake to keep the expenses within each quarter's appropriation. This year, the county reports, there were no supplemental appropriations. The 52 villages and town departments of health were consolidated into a single county department; a department of purchase was set up under a single commissioner, ending the old system of purchase by each separate department."

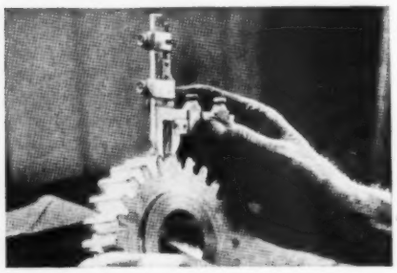
Impressive Accomplishments

The effectiveness of the central purchase and control plan of the County of Los Angeles, Calif., so impressed the county supervisors that they created the position of Chief Administrative Officer of Los Angeles County (a modified form of the council-manager plan) to exercise administrative supervision and control over all departments, services and institutions of the county, to coordinate their operations and to carry out rules, regulations and ordinances of the board. This authority also included the duties of County Purchasing Agent. The County Purchasing Agent, Colonel Wayne R. Allen, was appointed the first Chief Administrative Officer in addition to his regular duties. He now has charge of more than 50 de-

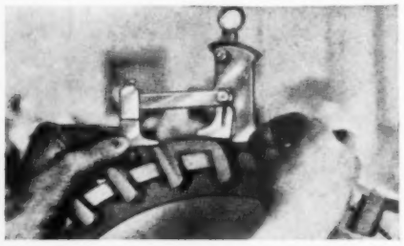
ARE YOU DOING THESE JOBS THE HARD WAY?



Here's an easy way to handle inside measurements—⅛ to 6 inches. Starrett Small Hole Gages No. 829 take care of the small stuff from ⅛ to ½ inch; Telescoping Gages No. 229 handle the rest up to 6 inches. Both types can be set to a given size and used as plug gages or expanded to "feel" for close or loose fits and miked for size.



Starrett Gear Tooth Caliper No. 456 saves complicated figuring on gear work. Measures both chordal thickness and addendum simultaneously—reads direct in thousandths of an inch and may be had in 20-2 or 10-1 diametral pitch.



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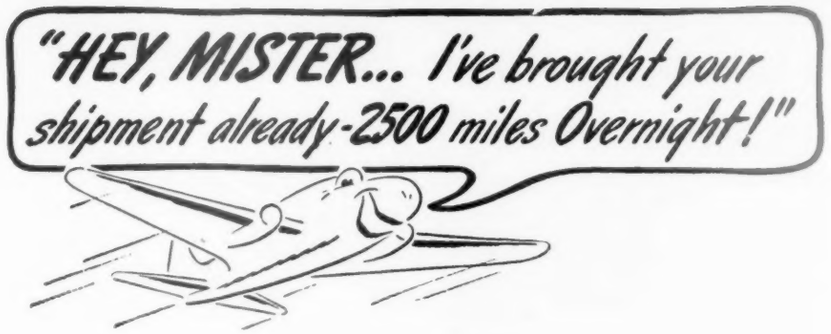
partments, employing more than 15,000 employes and spending more than $80,000,000 annually, including purchases made for school districts. Thus while the Chief Administrative Officer has all the responsibility of a county manager, all of his acts must be approved by the county board. The county supervisors of Los Angeles County have exhibited broad vision in the interest of the taxpayers of their community as they have created an organization which is a means of saving tremendous sums annually in the reduction of the cost of goods and in the reduction of excess labor and overlapping of activities.

Hamilton County, Ohio, has shown what can be done in the way of coordinating purchases by mutual agreement without benefit of statute. It has proven a means of saving hundreds of thousands of dollars annually for the taxpayers of Hamilton County and of the City of Cincinnati. In contrast to this I should like to point out that although the state legislature of Virginia has provided by law that two or more adjoining counties may appoint a joint Purchasing Agent, no counties in Virginia indicate that they have taken advantage of this plan.

Small counties should be encouraged to pool the bulk of their purchases with other adjacent counties and with large neighboring municipalities in order to obtain wholesale prices and a better quality of goods; also, where state laws permit, it is recommended that counties make purchases on favorable state contracts. If the orders are of sufficient size, the vendor can use them as a "back-log" of business to keep his plant running when without these orders it would otherwise be idle. This reduces his overhead and enables him to pass these savings on to the consumer. Some of the commodities which can be purchased in this manner are: coal, fire hose, road oil, crushed stone, sand, gravel, gasoline, lubricating oil, paper goods, highway signs, cement, asphalt, and sewer pipe.

Control of Storehouses

The consolidation of stores under one control system in the City of New York has been brought about by Russell Forbes, Director of Purchase. All goods received and disbursed by city owned warehouses are controlled at a central point through a punch card system. This has resulted in a reduction of inventories and of the number of warehouses necessary to function economically; it has reduced obsolescence and increased turnover; it has eliminated unnecessary items formerly carried in stock and unnecessary purchases; it has facilitated the transfer of goods from one department or warehouse to another. It has supplied a means for the intelligent preparation of budgets as it provides budget officials with the amount of stock carried on hand, the rate of turnover, the average cost, the prob-



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able consumption and many other pertinent facts which are necessary to intelligent and efficient budget-making. Stock is the same as money and no one would think of leaving idle dollars scattered on shelves or tucked away in corners. And yet that is virtually what is being done when stock is purchased and then stored away and forgotten.

The City of Milwaukee has adopted the New York plan of centralizing purchasing and inventory control. The next step will be to centralize the physical control of municipal warehouses and stock. We are greatly indebted to Russell Forbes for the time he has spent with Milwaukee representatives, explaining his system and its operation.

Selection of Purchasing Staff

Before prescribing the necessary qualifications for a County Purchasing Agent, let us see what is expected of a Purchasing Agent of industry. According to Frank D. Bryant, Standard Oil Company of California, in a talk given at a meeting of the Bureau of Occupations at the University of California, "The Purchasing Agent is a human being who by sound business methods and acceptable standards of ethics is endeavoring to assist management in industry to eliminate the vast waste in the purchase and use of materials. . . . It is necessary for a Purchasing Agent to have a very good disposition, to be actuated by fairness in the settling of disputes, to have an analytical mind, to be co-operative, to start in on his job in a pair of overalls, and to be able and willing to give suggestions in order to help management in the use of materials best suited for the products of his company, considering, of course, cost. . . . A Purchasing Agent should keep abreast of new products, should know materials, be versed in price trends and price structures, be able to buy the proper quantities and to understand losses due to obsolescence. A purchasing agent must also be a good salesman of his own services."

A public Purchasing Agent requires similar qualifications plus a wide general knowledge of materials and equipment used in the many diversified activities of county government, such as the purchase of equipment and maintenance supplies for hospitals, penal institutions and sanatoria, automotive equipment, parks, highways, sewers and lighting facilities. As his purchases cover practically the whole gamut of manufactured supplies and equipment as well as many raw materials, he should have a well rounded, personal knowledge of the use of these materials, supplies and equipment as well as sources of supply and approximate costs. This requires previous experience with a large firm and preferably with a public purchasing department. In order to properly select a Purchasing Agent and to provide adequate means whereby he in turn can select his assistants,

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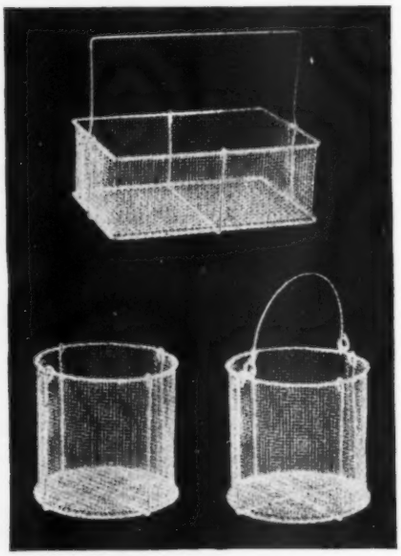

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it is recommended that competitive examinations be held.

Competitive Examinations

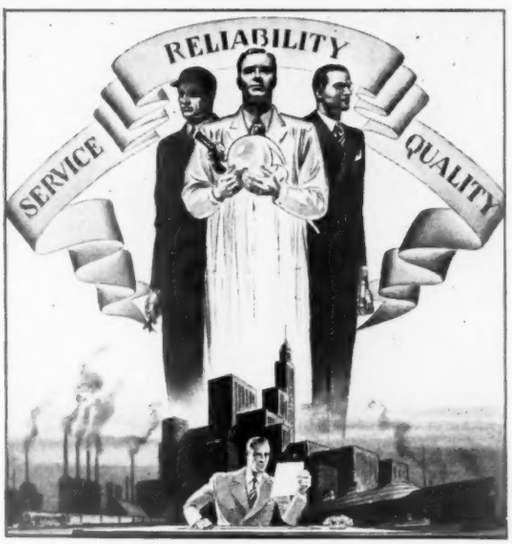
Walter N. Kirkman, Director, Maryland State Department of Budget and Procurement, and Chairman of the Governmental Committee, recommends that the nearest Purchasing Agents' association be asked to appoint a committee to assist in conducting the examinations and selecting the chief purchasing agent. This committee would normally be composed of Purchasing Agents of several large local firms including nearby governmental Purchasing Agents. Where the civil service system prevails in county government, the committee would assist the civil service commission in this work. The committee could prepare a statement of the qualifications and duties of the purchasing agent and his staff, suggest examination questions, conduct personal interviews for the chief purchasing agent, and assist in rating the examination papers. The Chief Purchasing Agent should select his staff from the eligible lists thus obtained.

As for the organization of the department, it is recommended that successful departments such as those already mentioned in this paper, be used as a standard with, of course, a scaling down of the number of employes and salaries for the smaller counties.

Basic Principles

In conclusion let me set forth the cardinal principles of modern centralized purchasing which apply to all public purchasing departments. If these principles are followed, savings of approximately 15% can be made without question.

1. The development of standards. (Reducing the number of kinds of commodities used for the same purpose, thus securing the most suitable and serviceable article for any given purpose.)
2. The preparation of definite specifications. (Thus increasing honest competition by eliminating ambiguities and misunderstandings in bidding, also facilitating inspection by providing a yardstick with which to measure deliveries.)
3. The taking of competitive bids. (Thus giving all qualified vendors an opportunity to bid and reducing prices through open competition.)
4. The study of market conditions. (Making it possible to purchase when market conditions are favorable.)
5. The purchasing of commodities outright in large quantities or contracting for them to be delivered as required over a stipulated period. (Thus enabling the purchaser to obtain the benefit of wholesale quantity prices.)
6. The effective inspection of all materials and rejection of those



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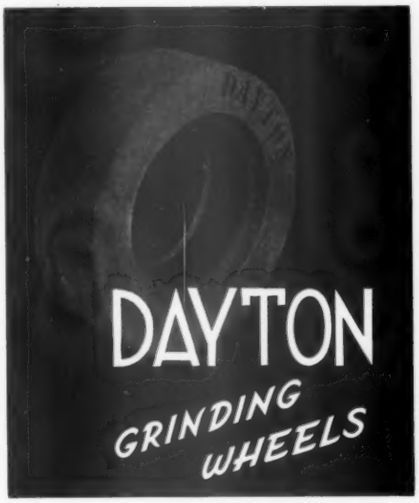

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which do not conform with specifications. (Thus insuring full value.)

7. The prompt payment of bills thereby earning cash discounts and improving credit status. (This is also reflected in lower bids.)
8. The control of storehouses and shop inventories resulting in:
   a. An accurate accounting of inventories.
   b. The prevention of waste by keeping stock moving, reducing stock and preventing the purchase of articles for stock which deteriorate rapidly or which may become obsolete.
9. The elimination of unnecessary purchases.
10. The centralized control of the sale of scrap and waste material.
11. The transfer of usable materials from one department to another.
12. The reduction in paper work and in the number of employes required to transact the purchasing function.
13. The reduction of unnecessary sales effort and expense.
14. The elimination of favoritism, "buck passing," connivance and underhandedness in public purchasing.

It has been proved by those who have made a study of this subject that the tax dollar spent under an efficient centralized purchasing plan will buy more, thus reducing budgets and operating expense. Moreover, political patronage can be eliminated in public purchases with resulting lower prices and improved quality of merchandise. When the proper type and quality of equipment is used for any given purpose, it costs less to operate and lasts longer. Centralized purchasing facilitates the selection of such equipment.

When each department purchases independently, the individual amounts purchased are small as compared with the total amounts purchased by all departments. This militates against economical buying. If these orders are grouped, the best prices can be secured. Departments compete against each other in the same market, often paying as many different prices for the same articles as there are departments doing the buying. There is danger of stocking too much merchandise, buying at the wrong time, failing to secure competition and neglecting to check deliveries.

There is now no excuse for public officials failing to take advantage of economies in buying scientifically, as the benefits to the taxpayer have been undeniably proved by many counties through years of actual experience. It is to be assumed, of course, that the department of purchase is properly manned by persons trained in purchasing technique and procedure, and that sufficient authority is vested in the department, so that political influence or favoritism will not handicap or prevent the maximum efficiency which is possible.

The mere centralization of purchases in one department is not a remedy *per se*. There have been instances where, through political appointments of incompetent and inexperienced persons, the centralization of purchases under one authority has resulted in the centralizing of inefficiency and favoritism. Moreover, a Purchasing Agent without sufficient experience should never be placed in this position of responsibility. Even though he were conscientious, tax funds could be lost each day due to his ignorance of sound purchasing methods and neither he nor the taxpaying public would even be aware of these losses. Only an experienced Purchasing Agent could point out where the "leaks" had occurred and how they could be prevented.

Control of Stores

(Continued from page 59)

see how they can actually be applied by describing a definite system which has been in use for many years on a large railroad.

First—every item of material authorized for stock is given a specific number which is used on stock cards, bin labels, requisitions, and all underlying forms. It is also used in correspondence, telephone and telegraph communications, and represents an official description of the item cut on a plate under which all purchases are made and all issues priced and reported. This eliminates the clerical labor of checking descriptions. Only the number needs checking.

Ordering Schedules

Second—all requirements of the same commodity are prepared all over the railroad on the same day, according to a schedule which is watched as a train schedule is watched. That is, all orders for hose, gaskets, packing and similar items may be prepared today. Tomorrow it may be plates, shapes and bars. This plan gives the Purchasing Department the opportunity to work on the entire requirement of the railroad at the same time, thus avoiding premiums charged for small quantities. Since stock conditions are reported at the same time, the Stores Department has the entire picture at outlying points and immediately makes transfers to liquidate surpluses. This eliminates any out-of-pocket cost for the materials so transferred.

For such materials as must be purchased, requisitions are passed to the Purchasing Department. All requisitions and transfer orders are printed mechanically from the same plates, and single item requisitions are forwarded to the Purchasing Department. That department may decide that several items of the same general class are to be or-

dered from one firm, in which event those requisitions are pinned together, the firm code marked thereon, and passed to a Service Department where the order and all necessary copies are made and mailed to the seller, the consignee, the Test Department, and any other interested party. By this method the consignee knows when the order is placed either by transfer or purchase, and may communicate direct with the shipper as to delivery. This method reduces to a mechanical operation each action except that in which human judgment must be exercised.

Manufactured Items

It is usual to find that corporations manufacture in their own shops a portion of the requirements and purchase the balance. The same method just described may be used whether the article is manufactured by the using corporation or purchased, the only variation being that the order is sent to the manufacturing department instead of to the Purchasing Department. This applies as well to the procurement of timber which may be treated with preservatives by the using corporation.

There is one particularly important link in this chain of operations and that is the one providing for the preparation of the official description of the article quickly after the approval of the plan authorizing its use. That is made secure by immediately cutting a new plate or changing the old one. Since the plate is used in printing the order, only the latest description will appear on the order. The plates contain the latest official descriptions of articles authorized for purchase or manufacture.

Changes in design are inevitable in any large organization, but they may be a prolific source of dead stock. An alert supply organization will be preparing for changes and will see that stocks of material likely to be changed are maintained at the lowest practicable amount, so that little obsolete material will remain on hand when the new design is ready. This is a fundamental function of the supply department in stock control. The practice of changing design of parts is certainly not to be condemned; but the supply department must constantly be alert to the possibility of those changes and be prepared for them.

Surplus Materials

Unapplied material belongs to the corporation. The supply department should be given full authority to move it to the point where it will be most useful to the corporation. Because it was ordered for a certain department and not used, is no reason for holding it indefinitely when the same material is needed elsewhere for immediate use. Some one must be delegated with authority to make any material on hand available for use at any other point. The supply department should have that authority, but this authority carries with it a responsibility that the progress of work

SEYMOUR NICKEL SILVER

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WHEN the shop calls for rod of a silvery white color—highly corrosion resistant—for free turning, cutting, threading and machining—remember that Seymour 18% leaded Nickel Silver rod will exactly fill the bill because it is a specialty product.

The result of almost a lifetime of study and observation, this rod is ideal for the manufacture of nuts, bolts, bushings and other fittings to be incorporated in cameras, scientific instruments, meters, etc. It machines very smoothly and with no undue tool wear. It plates readily; and, because of its silvery color, it can be chrome plated without underplating. Test samples sent on request.

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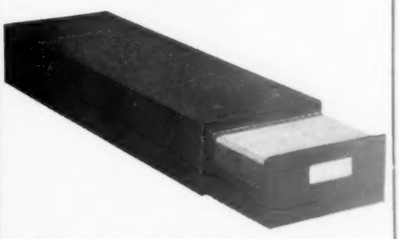

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be not hampered by any such moves.

The supply department must, perhaps more than other departments, build up a reputation for resourcefulness and energy. If it fails in this duty, the user will constantly doubt the ability of the department to furnish him with materials when needed. If that doubt exists, the user will continually prod the department to procure materials so he may see them long before they are required. While that operation satisfies the user, it is tremendously expensive to the company carrying the investment in materials longer than is necessary.

It is evident that stock control requires some sort of a guide which may vary with market conditions, to serve as a basis for the quantities to be ordered under the existing delivery conditions. A simple formula will provide this guide. The quantity used forms the basis, a multiplier is used to represent the delivery period and this factor varies with business conditions. From the result is subtracted the quantities on hand and due on unfilled orders. This formula is used only when no better guide exists and in no case is it used in place of one's judgment, where that judgment is based on adequate experience.

Since every order issued by the Purchasing Department is a potential payment out of the company's treasury, it is highly desirable the value of all orders placed during each calendar month be known. It is equally desirable that the value of the commitments outstanding at the end of each month be known, since they will eventually be received and paid for. In times of financial stress, such information is invaluable in determining the demands which the treasurer must be prepared to meet. The Purchasing Department of the Pennsylvania Railroad produces such information monthly through machine operation at very low cost.

Technical Considerations

The Supply Department, and particularly the Purchasing Department, cannot afford to be uninformed on technological developments, in fact, just as the old type salesman has been replaced by the sales engineer, so the old type buyer has been replaced by the technically informed executive. Contacts between the selling and buying companies should be through the Purchasing Department, which will not be accomplished unless both buyer and seller know the technical characteristics of the materials and supplies they are talking about. There is no good reason why the Supply Department should not have the technical talent to handle a transaction in most cases from the time it is initiated until the material

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ACE quality in low price models for small offices, schools, or homes, assures Lifetime Trouble-Free stapling service.
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ACE STAPLE REMOVER
Saves your finger nails — prevents torn papers.. 60c

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Makers of the World's Best Stapling Machines
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We can handle items such as Light stampsemble and/or fabricate at low labor costs. We can handle items such as Light stampings, General Machine Products and Pipe Fabrication. Send blue prints and specifications for quotation, to Box No. 360, Youngstown, Ohio.

BUYER WANTED BY LARGE MANUFACTURER—Familiar with machined parts, tools and fixtures, preferably a man between the ages of 30 and 40. In reply give full experience. Write Box No. 920, PURCHASING, 205 East 42 Street, New York, N. Y.

AVAILABLE — Young man, 25 years of age for position of Purchasing Agent or Assistant. Six years' experience. Location no object. Reply to Box No. 921, PURCHASING, 205 East 42 Street, New York, N. Y.

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STEELGRIP is a stronger lacing for all power and conveyor belts. Clinches smoothly into belt, compresses the ends, prevents fraying, 2-piece hinged rocker pins prevent excessive wear. In boxes or long lengths.

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arrives, or to be so closely coordinated with the technical departments that the transaction will be handled virtually as one department. The more this operation is condensed, the more effective will be the stock control.

Conclusion

Now let us consider the broader aspect of stock control how it affects the country as a whole economically. Perhaps the best way to do this is to look for the failures that have occurred and how those failures reacted on the business life. A peak inventory is an evidence of failure of stock control. The immediate effects are:

1. Increase unemployment until the excess can be worked off.
2. Create extra costs for interest on the investment, labor costs for handling and protection, and depreciation costs.
3. Postpone any contemplated beneficial changes in design.
4. Require the use unnecessarily of extra storage space.

The history of the past ten years shows that industrial employment declines from about the time inventories reach their peak until about the time they reach their low point. It is not safe to say that high inventories are the sole cause of the decline in the employment figure, but they are certainly important contributory factors. It is probable that the sharp drop in employment in 1937 would not have been serious had it not been for the orders placed in excess of the need in 1936. It is easy for us who are engaged in stock control work to disclaim responsibility by saying it was the spirit of the times, or we were compelled to protect ourselves against slow deliveries, or several other phrases that don't ring true. We who see this relationship between inventories and employment cannot escape the moral responsibility at least for high inventories until we have exhausted our reserve power trying to find the trend of future needs, and in constantly citing the damage to labor and to industry which inevitably comes in the wake of high inventories.

A perfect plan may fail because of improper coordination. A Supply Department is made up of a mass of details which must be coordinated with the designer's plans, with the operating or manufacturing facilities, with the market's demands, and then constantly watched to see that it stays that way. There is one fact needing emphasis. No one system of supply is best for all situations. There is however one best supply system for each situation, and to find that system requires experience, good judgment, willingness to render a service, dogged perseverance, and a reasonable amount of good nature. Technical training of the personnel is highly desirable but not imperative. Ability and willingness to handle irritating details to a conclusion are necessary but, more important than any other one characteristic, is an understanding of the relationship of the supply department to the departments it serves.

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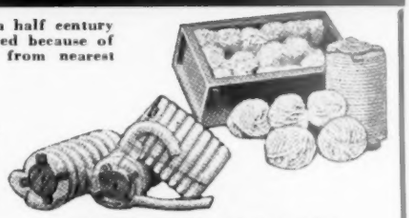
CAREY Asbestos Products are backed by over a half century of manufacturing experience. They are preferred because of their high quality and dependability. Order from nearest CAREY Branch—or write Dept. 68.

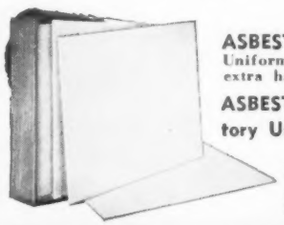


CAREYCEL PIPE COVERING

INDENTED Asbestos Insulation for insulating pipes, domestic and industrial boilers, water heaters, ovens and other apparatus carrying temperatures up to 300° F. Heat losses are 30% less than through equal thickness of air-cell asbestos insulation. Sheets and blocks, either flat or curved to any desired radius.

ASBESTOS ROPE AND WICK PACKING

Wick Packing—½- and 1-lb. balls. Packed in 50-lb. cases.
Rope Packing—25- and 50-lb. reels.



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Uniform standard sheets, 42" x 48". Two grades, medium and extra hard.

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Carefully designed for specific service conditions, such as pointing up and filling cracks; for finishing over molded insulation and for small fittings; for large fittings, boilers, tanks, stills, and stack and breeching lining.

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Dependable Products Since 1873
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REDUCE STRESS
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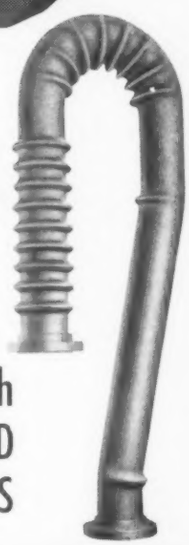
CREASED BENDS with CORRUGATED TANGENTS



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Harper is your logical source of supply for every type of non-rust fastening made. Brass, Bronze, Everdur, Monel and Stainless... bolts, nuts, screws, washers and other fastenings—Harper makes them all to defeat those forces which destroy common fastenings.

3600 ITEMS IN STOCK
Immediate shipment . . . Almost every corrosion-resistant alloy.

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Harper's plant is set up to turn out a great variety of unusual work economically. Ask for Catalog 72 which shows the full Harper line and contains important reference data. Write The H. M. Harper Company, 2606 Fletcher St., Chicago.

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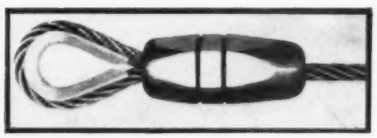
New PRODUCTS · IDEAS

WIRE ROPE CLAMP



■ **The "Safe - Line"** Wire Rope Clamp, described in a previous issue of this magazine, has been granted the approval of the Underwriters' Laboratories, Inc., for use on the strongest of wire ropes. It is claimed by the manufacturers of the "Safe-Line" Clamp that an approval of this sort has never before been obtainable where a clamp is used to form and hold a loop.

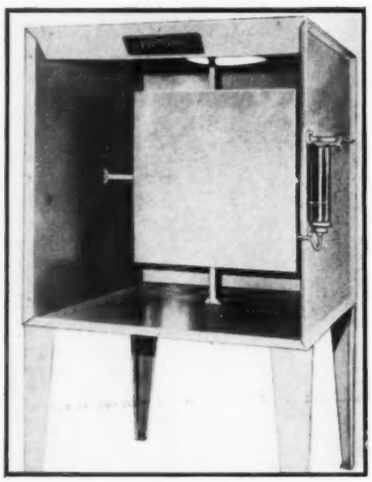
The tests necessary to obtain this approval were very exhaustive and consisted of both tension and vibration tests of numerous sets of samples.

These samples were assembled by both the Laboratory employees and the Manufacturer, and the ease of assembly was commented upon in the summary of the report. The shielding of the sharp ends of the wire rope to prevent personal injury is very obvious and permits free and safe handling of the rope.

The company announced this safety clamp in November of last year and report that their sales have increased tremendously each month since then, with no sign of a let up. Many companies have already standardized on this clamp.

The Underwriters' Laboratories, Inc., report showed the clamp as practicable because it is readily installed and does not require special skill or experience on the part of the installer, and will not loosen under vibration. Made by National Production Co., Detroit, Mich.

LOW PRICED SPRAY BOOTHS

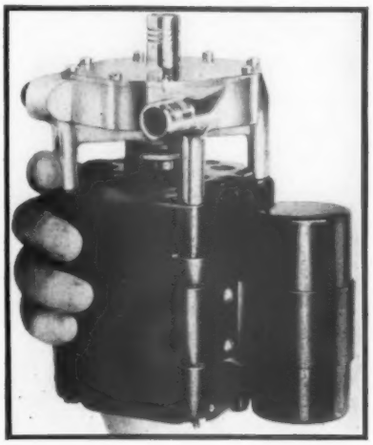


■ **Answering a long felt need** on the part of many small manufacturers and dealers who have painting to do where a small, inexpensive spray booth would be ideal, the Binks Manufacturing Company, Chicago, Ill., has announced the production of two low priced booths as an addition to their low-cost line.

The booths are sold in one standard size only — width, height and depth being 3'6" each. All panels are interchangeable, so that the exhaust fan can be run out of top, side or back of booth, as desired.

A line of inexpensive 15" diameter exhaust fans has been designed to be used with the new booths.

MIDGET CENTRIFUGAL PUMP



■ **This newly designed** and engineered midget centrifugal pump has been developed by Eastern Engineering Company, New Haven, Conn.

Some of its main features are: a. compact size and construction, b. performance characteristics in relation to size, c. capacity for continuous duty operation, d. suitability for use in presence of fire and explosion hazards.

The pump can be used in all industrial, pilot plant, laboratory and experimental applications where thin liquids are to be handled, especially when space, weight and portability are factors.

It is 7¾" long, 6⅜" high, 5⅛" wide, and weighs 14 pounds. Manufactured in stainless steel, Monel metal, chromium plated bronze, brass, cast iron, Hastelloy and other alloys. All parts coming into contact with liquid are of common alloy.

INSIDE MICROMETERS

■ **The Lufkin Rule Company** has just placed on the market No. 80 series inside micrometers. These are good micrometers, though substantially lower in price than the No. 680 series. They are designed for those mechanics not requiring various of the features found only in the No. 680 line.

In these inside micrometers the range is obtained by use of extension rods and collars, No. 80A having six rods and a one half-inch collar and range from 2 to 8 inches, while No. 80B has ten rods and a half-inch collar and range from 2 to 12 inches. Both have half-inch movement of screw.

"PULL-TAB" OPENER for ECONOMY

In every roll of SAFETEX gummed tape, regardless of width or basis weight, there is a "PULL-TAB" under the first layer of paper. By means of this PULL-TAB fresh rolls may be opened without wasting more than three inches of tape and with no loss of time whatever. *Sold by distributors everywhere.*

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Carboy Truck	Hoods	Safety Signs
Carboy Tilter	Inhalators	Salt Tablets & Dispensers
Face and Eye Shields	Ladders	Waste Cans
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Foot and Toe Guards	Leggings	
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Many purchasers are making big savings by checking over PAGE "SHAPE" WIRES

● In the big Page line of "shape" wires there are wires of many materials, many shapes and many sizes. Many alert buyers are finding important advantages in checking over their requirements against what Page has to offer.

Page makes "shape" wires of low carbon, high carbon and stainless steels. These wires are furnished in cross-sectional areas up to and including No. 3 BWG in wire designation, or about .250 square inches. Widths run up to ⅜-inch.

BUY ACCO QUALITY *in Page Wires, Page Welding Electrodes, and Page Wire Fence; Lay-Set Preformed Wire Rope; Reading-Pratt & Cady Valves; Campbell Abrasive Cutting Machines; American Welded and Weldless Chain; Ford Chain Blocks, Cranes and Trolleys.*

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LASTING SHOP AIDS

Fig. 732 "Hallowell" Steel Work - Bench. Drawer is extra.

"HALLOWELL" STEEL WORK-BENCHES

● Unlike old-fashioned wood benches, "Hallowell" Steel Benches cannot splinter, split, get wobbly with age or soak up oil and become fire hazards. Their tops provide a smooth and always rigid working surface ideal for both precision and heavy work.

Constructed to permit easy movability, "Hallowell" Benches permit flexible shop arrangements. Of styles and models there are over thirteen hundred available for quick delivery right from stock. (Shipped knocked down.) It's quicker, easier and costs no more to buy "Hallowells"—investigate today the models that belong in your shop!

"HALLOWELL" STEEL TOOL STANDS

● Popular in repair and service shops where neatness and efficiency are important, this "Hallowell" Stand moves easily to wherever it's needed, keeps tools handy but in order. Saves steps, time and money. Made in a variety of types for all purposes.

Fig. 705

Ask your distributor, or write—

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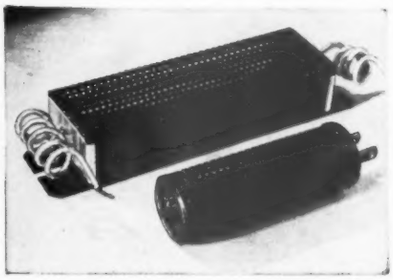
JENKINTOWN, PENNA. BOX 590
BRANCHES
BOSTON · DETROIT · INDIANAPOLIS · CHICAGO · ST. LOUIS · SAN FRANCISCO

FLUORESCENT LAMP RESISTORS



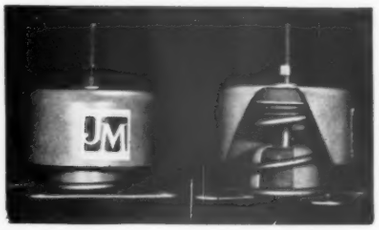
■ **Series Resistors** for inclusion in the power circuit of fluorescent lamps operated on d.c., have been placed on the market by Clarostat Mfg. Co., Inc., Brooklyn, N. Y., either as an accessory or as built-in initial equipment. These resistors are intended for use with the G.E. type d.c. reactors or their equivalents.

Series FT or accessory type, plugs into the power circuit of a fluorescent desk lamp or other fluorescent lamp operated on d.c. The perforated metal case of this resistor is finished in black wrinkle-finished baked enamel, and houses a sturdy Glas-ohm resistor. Male and female Edison ends facilitate plugging into outlet and taking the connecting plug. Unit measures 3⅝" long by 1½" dia., and weighs 1¾ ounces. Available for 15-watt and 20-watt fluorescent lamps.

SPRING CHECKER

■ **A rapid and accurate** method of testing compression springs is afforded by the Link Spring Checker made by Link Engineering and Manufacturing Co., Detroit, Mich. Other applications for this equipment include tests for load required to operate valves, firing pin assemblies and similar units. The standard model handles springs up to 6" free height and 2⅝" diameter, in 10-50-250 lbs. capacity. It is provided with a 6" vertical height scale graduated to 1/32" for indication of compressed height. The unit shown has a special 1" travel reverse-reading dial indicator fitted in an adjustable ram bracket to allow maximum of range of 4". The dial indicator is adapted to the checking of springs with close height tolerances.

CONTROLLED SPRING ISOLATOR



■ **An easily installed** vibration isolator, designed to economically control machine vibration and reduce the resulting noise, is being manufactured by Johns-Manville, New York, N. Y. This device was developed for use on the bases of motors, generators, pumps, ventilating fans, and similar equipment where vibration and excessive motion create noise and tend to wear out machine parts and damage connections as well as crack the supporting walls and floors.

The working parts of the unit consist of a coil spring and a rubber load pad, which support the equipment and isolate vibration, and an adjustable rubber snubber inside the base, which controls excessive motion. Through the combination

of these parts, the isolator provides both the high compliance necessary for good isolation and the control needed to limit motion in the equipment.

DUST HOOD

■ **Protection of workmen** against silicosis and other occupational diseases caused by inhalation of dust or fumes is offered by a new light, comfortable hood introduced by Jackson Electrode Holder Co., Detroit, Mich. The hood is of black, tailored, rubberized fabric, fitting the shoulders snugly. Durable fiber headgear has extra wide sweatband and is equipped with curved air tube having twenty-four scientifically located vents. Tube does not touch the brow but conforms to its curvature. Light, flexible, fabric-bound hose clipped to operator's belt and equipped with quick detachable fitting serves to connect with plant airline.

Clear vision, together with perfect eye and face protection, are afforded by a standard 6½ x 9¾ in. Plastacele window. This outfit has been found effective in foundries, granaries, cement and lime plants and other locations where dust conditions prevail.

OFFSET RATCHET SCREW DRIVERS

"Yankee" No. 3800 Offset Ratchet Screw Driver. Blades, 1/8" x .045 and 7/16" x .060.
"Yankee" No. 3900 Offset Ratchet Handle. Hex holds Adapters. (Right)
Hex Wrench Adapters for hollow setscrews and cap screws. Various sizes.
Screw Driver Adapters with blades for slotted screws. Various sizes.

■ **Four offset ratchet** tools have been introduced by North Bros. Mfg. Co., Philadelphia, Pa. The series includes assorted adapters and has a wide range of serviceability in work with both slotted and hollow screws.

No. 3400, lengths 3 15/16", is complete with three blades, two ratchet and one rigid. No. 3800, here illustrated, also is a complete tool of heavier construction, 4¾" overall, with two blades of different dimensions. No. 3600 is an offset ratchet handle for use with interchangeable adapters in work with smaller screws. No. 3900 is an offset ratchet handle (illustrated) of heavier construction for larger screws. Adapters fit into hexagonal opening and are held by friction ball. Certain adapters contain flatted screw driver blades for use on slotted screws. Others are fitted with hex ends for driving hollow-head screws. All adapters have knurled spinner tops for the quick starting of loose screws.

These new offset tools are equipped with the famous "Yankee" ratchet, have tremendous driving power and are claimed to be more efficient for close-quarter work than any offset screw-driving tools heretofore produced.

Procter and Gamble use KIMPAK to protect and add eye-appeal to their Floral Soap in beautiful leatherette gift package.

Kimpak

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protects your product dresses your package

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* Reg. U. S. and Canada Pat. Off.

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Attention of _____ *Our Product is* _____

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Every business needs this binder—the only one made that can maintain compression on as few as 50 sheets! It saves time because sheets can be removed and replaced in an instant. It saves space because the posts retract when not in use. And the Bing! Speed Binder is so light and so simple to operate that even a child can handle it.

★ **NO PROTRUDING POSTS**—The Bing! Speed Binder occupies a minimum of storage space, because this unique post binder is **flush all around!** The flexible posts snap closed—retracted into the locking bar, out of sight and out of the way. The 3-ply stainless steel posts are equipped with bronze fittings that provide automatic compression when closing.

★ **INSTANTANEOUS ACTION**—No time-wasting winding and unwinding! To open, you merely press a catch and the posts fly up to a vertical position. To lock under compression any desired number of sheets, simply close the post covers. The flexible posts can be locked at any point—a unique feature. Perfect alignment of sheets is maintained during opening and closing.

★ **AMPLE WORKING SPACE**—The Bing! Speed Binder is built to allow maximum space for insertion and removal of sheets. Made in a range of sizes to accommodate all standard accounting forms. Your choice of 2 binding styles: green canvas sides with red leather corners, and full black fabrihide, gold tooled. Black Ducoed metal.

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Standard B&P Blank Books
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Manufactured by
BOORUM & PEASE COMPANY
General Offices: 84 Hudson Avenue
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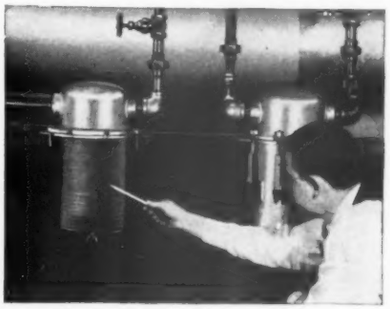
SOLD BY LEADING STATIONERS EVERYWHERE

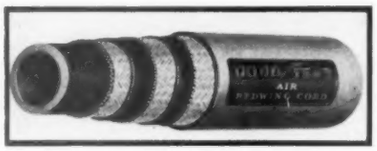
FILTER DELIVERS OIL-FREE AIR



■ **This protectomotor** air filter, recently introduced by the Staynew Filter Corp., Rochester, N. Y., is primarily designed for the complete removal of the slightest traces of oil from compressed air lines. In addition, it effectively prevents the passage of moisture as well as dust, dirt, pipe scale or other foreign matter commonly found in pipe lines for air supply.

First built to solve a difficult problem in instrument protection, this model was later adapted for use on the combustion control system of the electric power unit of a public utility. Several installations were also made for instrument protection and many new uses developed rapidly. As a result, the model is now a standard item in their line of filters for air, gases and liquids.

AIR HOSE



■ **Designed especially** for heavy duty pneumatic tool service is Goodyear Tire & Rubber Company's Red Wing air hose. Introduced by the company's Mechanical Goods Division, Akron, Ohio, this air hose is comprised of three principle components.

The tube is of non-porous rubber, resistant to action of hot and cold air. Lubricants in the air will not cause swelling or flaking, obviating clogging of tools with rubber particles.

Reinforcement is provided with three plies of multiple-braided, special cabled cotton yarn, providing a high safety factor for working pressures and high resistance to blows and impacts.

The cover is a heavy gauge of soft red rubber with a high tensile strength, providing utmost resistance to cutting from rocks, ore, or other materials. It likewise is abrasion- and sun-resistant.

A product designed with quality the first consideration, this hose is available in ½-inch, ¾-inch and 1-inch sizes.

INDUSTRIAL TRUCK

■ **Its ability** to make a complete turn in a 46-inch radius also qualifies the new "Centrol" power industrial truck to operate in cramped areas throughout the factory.

It passes through doors 4½ feet high, traverses plant aisles 48 inches wide, turns completely around inside a boxcar, and travels under load on plant elevators and up ramps.

It is equipped with forks and transports 2000-pound loads on pallets or skids. It is the smallest of a series of center control trucks recently introduced by The Elwell-Parker Electric Co., Cleveland, Ohio.

Taking The Grief Out Of Shipping Thin Plywood Panels!

Thin panels of plywood for the manufacture of tea chests – turned into strong, compact, damage-resisting bundles by the Stanley Strapping System. With the Stanley "Ace" Strapping Tool and accessories, one man can tighten, cut and seal sturdy steel bands around packaging units quickly and easily. Packing time is saved – danger of damage in transit reduced to the minimum. Without obligation, let a Stanley engineer make recommendations for safer, more economical packing of *your* products, or write for interesting folder, "Twice As Fast." The Stanley Works, Steel Strapping Div., 144 Lake Street, New Britain, Conn.

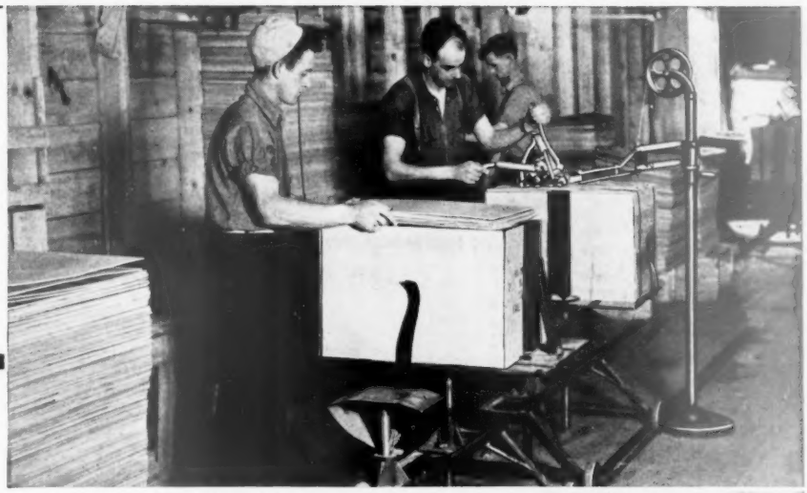
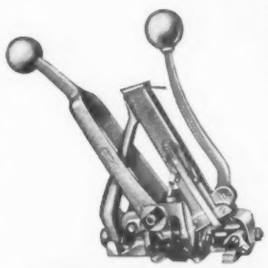


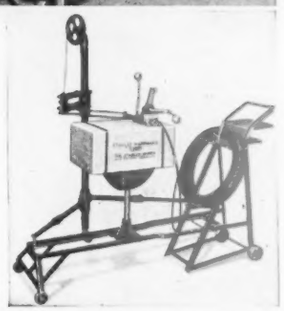
Photo by courtesy Plywood Corp., 250 Stewart St., Boston, Mass.



Stanley "Ace" Strapping Tool tightens, cuts and seals in two easy operations. Made in three sizes to handle ¼", ⅜" and ½" strapping.

• • •

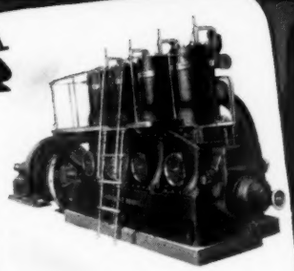
Stanley "Mechanical Arm" Tool Support. Tool is fastened directly to the arm, which is counter-balanced and will remain in any position.



STANLEY
TRADE MARK

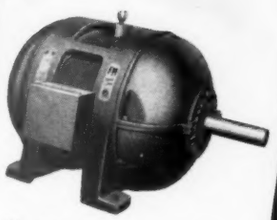
STANLEY STRAPPING SYSTEM

FOUR OF A KIND—*AND ALL ACES!*

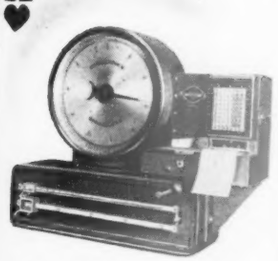


Fairbanks-Morse
DIESELS
5 TO 1400 H. P.

Fairbanks-Morse
PUMPS
1⅓ G.P.M. TO 150,000 G.P.M.



Fairbanks-Morse
MOTORS
¼ TO 10,000 H.P.



Fairbanks-Morse
SCALES
.002 OZ. TO 1 MILLION LBS.

● Nearly every industry uses one or more Fairbanks-Morse products, because Fairbanks-Morse makes the right type of Diesel, motor, scale, and pump for each job—and makes each type *right.* In addition, the centralized responsibility of Fairbanks-Morse, demonstrated to industry through more than a century, simplifies purchasing and *protects the purchaser.*

7713-EOPSA40.9

FAIRBANKS-MORSE

Pumping, Power, and Weighing Equipment

600 S. Michigan Ave., Chicago, Ill.

Branches and service stations throughout the United States and Canada.

Armstrong Tool Holders Are Used in Over 96% of the Machine Shops and Tool Rooms.

90% Cut in High Speed Steel Consumption with

ARMSTRONG TOOL HOLDERS

An ounce of high speed steel in an ARMSTRONG TOOL HOLDER does the work of 10 ounces in a forged tool. This means that every time you replace a forged tool with an ARMSTRONG TOOL HOLDER you take a 90% discount on the cost of high speed steel for that operation. This is a permanent and cumulative saving too, for ARMSTRONG TOOL HOLDERS are permanent tools that give years of service, and each with a few small cutters will do the work of a complete set of forged tools.

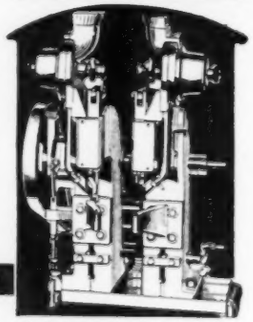
With ARMSTRONG TOOL HOLDERS, that "Save: All Forging, 70% Grinding and 90% High Speed Steel," available from any nearby Mill Supply house, for every operation on lathes, planers, slotters and shapers, it is wasteful to permit even occasional use of forged tools where there is an ARMSTRONG TOOL HOLDER to do the work. Make it a shop rule to start each new job with ARMSTRONG TOOL HOLDERS, to use the correct tool holder on every operation, and as your ARMSTRONG System build up, watch "costs" swing to the profit side.

A new C-39 Catalog sent upon request

ARMSTRONG BROS. TOOL CO.
"The Tool Holder People"
303 N. FRANCISCO AVE.
CHICAGO, U. S. A.
Eastern Warehouse and Sales:
199 Lafayette St., New York

"WE'VE PUT OUR RIVETING JOBS ON A MASS PRODUCTION SCHEDULE WITH MULTIPLE SETTERS"

"Cost of finished assemblies was a big problem in our plant until we tried Chicago double rivet setters. We now get all the advantages of lower cost through mass production methods. Furthermore, the feature of adjustable riveting centers of our Chicago equipment practically eliminates the need for buying new riveting units every time slight changes are made in product design."



MODEL 55—sets two 1 8" tubular rivets at once on centers from 7/16" to 7". Larger models available. Bench and pedestal types.

WRITE FOR CATALOG

Learn about the production of this money-saving machine in your own shop. No obligation.

Chicago RIVET & MACHINE CO.
1851 So. 54th Ave. (Cicero P. O.) Chicago, Ill.

AUTOMATIC TUBE SPRAYER

■ **An automatic sprayer** to coat the inside and outside of steel tubes, 4" long, with an inside diameter of 1", has been built by Eclipse Air Brush Company, Newark, N. J.

The tubes are placed in an upright position on an automatic turntable which rotates them as they pass in front of a solenoid operated spray gun, synchronized with the action of the turntable.

A treadle operated spray gun coats the insides of the tubes as they are set into a holder on a stationary table. The setting and removing of the tubes for both inside and outside coatings are manual operations.

Production on this work is 1200 per hour for the outside, and the same for the inside.

ALL-SYNTHETIC CURB PUMP HOSE

■ **After more than eight years** of exhaustive research and constant service tests, the Hewitt Rubber Corporation of Buffalo, New York, has developed an all-synthetic, oil-proof rubber curb pump hose.

The use of Hewprene synthetic rubber throughout the entire hose, including not only the inner tube but also the ply insulation and the outer cover, marks an important advance in basic construction principle and provides many advantages which lengthen service life and increase operating efficiency.

The smooth oil-proof synthetic inner lining saves time by increasing the rate of flow and prevents product discoloration or contamination.

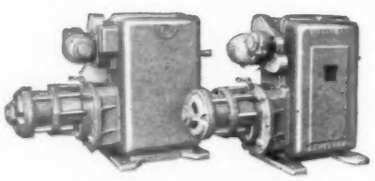
The use of this synthetic rubber in both the ply insulation of the hose wall and the outer cover provides added protection against evaporation loss and ply separation. Tests show that this all-synthetic construction gives more than twice the resistance to permeation by gasoline that hose of the same thickness does which is built of natural rubber with only a synthetic lining.

MOLDING COMPOUNDS

■ **An addition** to their series of phenolic molding compounds, to be known as 1905 Black has been announced by Durez Plastics & Chemicals, Inc. of North Tonawanda, N. Y.

This material has an impact strength of .6 (ASTM) and heat resistance of 418° F. Unusually good gloss for high-impact compounds is reported with this material. It is available only in the new particle size which is especially designed for free flowing through feeders and hoppers to simplify the production of preforms. Due to the high bulk factor of this series, deeper preform cavities are required. Otherwise, thin preforms will result.

UNIQUE APPLICATION OF SPEED CONTROL



■ **To solve** a particular speed control problem for the operation of a very heavy machine, two transmissions are used. One unit controls spindle speed—the other, feed screw speed. Both units are required to operate in vertical and horizontal position during the cycle of operation.

The spindle control may be set for any desired speed. When the stop button is pressed, the spindle is reduced to minimum speed before the motor circuit is opened. Should the machine be stopped suddenly, the spindle will return to slow position before starting. Thus the spindle of this very heavy machine always starts at the slowest speed, then accelerates at a controlled rate, to the present operating speed. Made by Lewellen Manufacturing Co., Columbus, Ind.

SAVE ON THE "TURNOVER"

with Central DOUBLE CHAMFERED NUTS . . . Both Sides Are Right Sides!

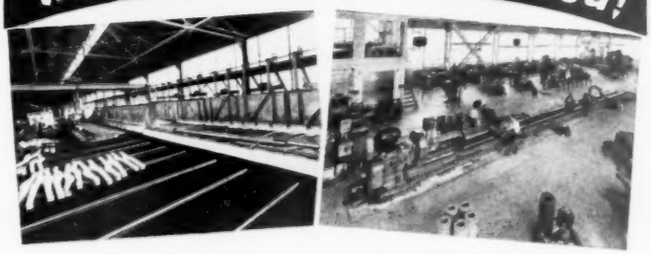
★ That's it . . . both sides of Central Double Chamfered Nuts are right sides. No heads or tails. Assembly line workers pick 'em up *right* side up every time. No thumbing or fumbling for BIG SAVINGS on assembly costs.

Let us send samples of these clean bright, well-made, uniformly shaped and threaded Double Chamfered Nuts. Find out how much faster they pick up and spin on for a perfect fit.

Order any quantity in steel and brass for same day shipment out of stock. Write for full details today.

CENTRAL SCREW COMPANY
3515 SHIELDS AVENUE • CHICAGO, ILLINOIS

FACILITIES that Mean Savings for You!



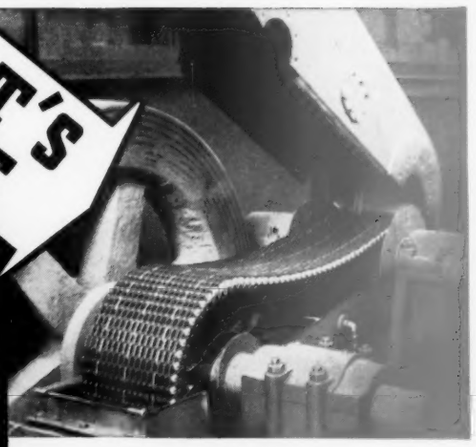
Beside our well-equipped steam hammer, drop and upset forgings departments capable of turning out many hundreds of tons of forgings a day, and our heat-treating department with one of the largest batch furnaces in existence, we operate a large, modern machine shop equipped for any machining that we could be called upon to do—fast and economically. Large stocks of specification steels are carried on hand at all times—ready to go into the forging furnaces at a moment's notice.

We produce forgings of all types—rough, heat-treated, semi-machined or completely finished ready for assembly. These facilities are saving for many manufacturers whose own shops are at this time glutted with production. How about you—can we help you out? Send blueprints for quotation or have our representative call.

KROPP FORGE COMPANY
World's Largest Job Forging Shop
5315 W. Roosevelt Rd., Chicago
Representatives in Principal Cities

IT'S TRUE

Even in FIRST COST SILENT CHAIN DRIVES ARE OFTEN *Lower than Belts*



● Actually they cost less... even their first cost being lower than belts in many instances. Over a period of years, they always show important savings because they are built to give constantly efficient service with practically no attention or upkeep expense. They transmit full speed and power... never slip ...save space...and are smooth and quiet in operation. Cut your production costs...save maintenance trouble and expense by equipping your machines with Silverstreak Silent Chain Drives. Send for data book No. 125.

Link-Belt Company, Indianapolis, Chicago, Philadelphia, Atlanta, San Francisco, Toronto, or any of our offices located in principal cities.

8005

Send for this 96-page engineering data book No. 125.

LINK-BELT
Silverstreak
SILENT CHAIN DRIVES

WHEN THE UMPIRE CRIES . . .

Play Ball!

--*FELTERS CERTIFIED FELT* plays an important part

IT'S not hard to know why Felters Certified Felt is chosen to absorb the "sock" that a catcher's mitt must absorb because Certified Felt can take it and can protect the valuable hands of baseball players whose worth to their clubs is valued in the hundreds of thousands of dollars.

So too can Certified Felt take the "sock" of a machine, which, without a "sock" absorber, would tend to tear down floors, disturb nearby machinery, and make excess noise.

FELTERS CERTIFIED FELT
as used in the Catcher's Mitt by
WILSON SPORTING GOODS CO.
makers of fine sports equipment
Five layers of Felters Certified Felt make up the padding of this mitt.

Send for our completely illustrated booklet entitled *"Unisorb in the Industrial Plant"* which tells of many applications of felt to reduce vibration in industry.

THE FELTERS COMPANY, INC.
210 SOUTH STREET, Dept. B-8 BOSTON, MASS.
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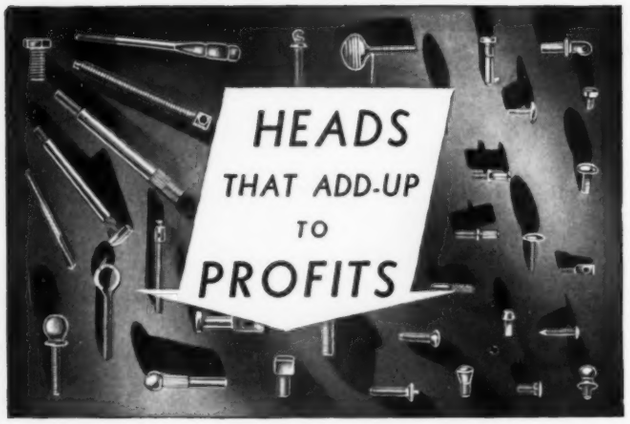


IF YOU require made-to-order screws and headed parts it will prove to your advantage —and PROFIT— to consult PROGRESSIVE. We specialize in the cold upset manufacture of fastening devices requiring heads, threads and finishes to meet individual needs. The 'head work' of PROGRESSIVE specialists plus the most modern equipment means economical production of parts made to the highest quality standards. Submit sample screws or specifications for our estimates.

QUALITY PROMCO BRAND

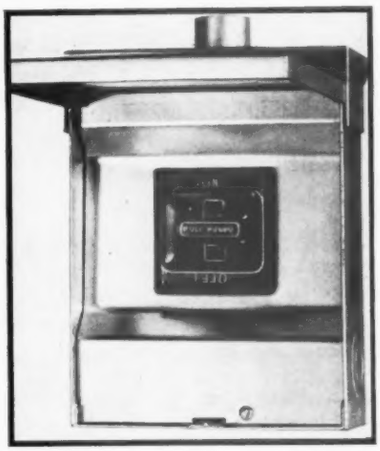
The PROGRESSIVE MFG. CO.
TORRINGTON · · · CONNECTICUT

WHEEL CHART

■ **A handy** wheel chart, which contains complete engineering data about all the various types of Meehanite castings available to industry, has been prepared by the Meehanite Research Institute of America, Inc., Pittsburgh, Pa.

The wheel quickly reveals the physical properties of general engineering castings as well as heat corrosion, and wear resisting types. A chart will be mailed free upon request.

OUTDOOR 60-AMPERE SWITCH



■ **Important design changes** in the outdoor 60-ampere switch using the well-known Fuse-Break has been announced by Square D Company, Detroit, Mich. This device is for 3-wire S/N 115/230 volts a.c. service, with a grounded neutral. These switches are used as main service disconnects or as range switches on outdoor installations wherever protection from the weather is necessary.

The base is made of strong, light weight bakelite. The pull-out, also of bakelite, has "ON" and "OFF" positions clearly indicated. Solderless connectors are used throughout.

The enclosure is fabricated from galvan-nealed steel, with aluminum finish.

FLEXIBLE COUPLINGS

■ **Two forged steel** flexible couplings with 1⅛" and 1⅝" maximum bores respectively have been added to the Ajax line of the Ajax Flexible Coupling Co., Westfield, N. Y.

"These new couplings provide extreme strength for heavy duty service with a high factor of safety," stated Wayne Belden, Vice President, in commenting on its design and application.

Flanges are forged from SAE No. 1020 steel. They are specially designed to meet the present trend of using alloy steel shafts carrying a high percentage of their torque capacity.

VENTILATING FAN

■ **An all purpose** ventilating fan that provides any normal required amount of air changes without objectionable noises has been placed on the market by Autovent Fan & Blower Co., Chicago, Ill.

Features include "V" belt drive that makes possible slower, quieter operation and greater efficiency with 1750 r.p.m. stock motors than heretofore obtained with costlier, low speed special motors.

New design 3-blade fan wheel supplies or exhausts unusually large volumes of air at extremely low speeds. Large enough volumes of air are handled to do a comfort-cooling job as well.

More Pipe Cuts with this RIDGID Thin-Blade Cutter-Wheel

Standard RIDGID *No. 1 and 2 Pipe Cutter*

THIS new type cutter wheel saves time and expense in *your* shop. Rolls through pipe quickly, easily. Its forged blade, assembled in a solid hub, extra-thin and tough, actually cuts more pipe per wheel, saving you money. And cuts true in the powerful smooth working Standard RIDGID Cutter. Made also in heavy-duty pattern, both cutters and wheels. Put RIDGID on your approved list. Buy at your Supply House.

THE RIDGE TOOL COMPANY · ELYRIA, OHIO

RIDGID PIPE TOOLS

How much does HEAT-FAG Cost You . . . and your men?

Does your plant pay tribute to this unseen force that saps men's energy and lowers efficiency? Heat Fag threatens all workers when body salt sweated out by hot, heavy work is not replaced. Play safe. It's easy and inexpensive to provide salt tablets for workers who sweat. A small investment now will pay big returns when hot days arrive.

MORTON'S SALT TABLETS

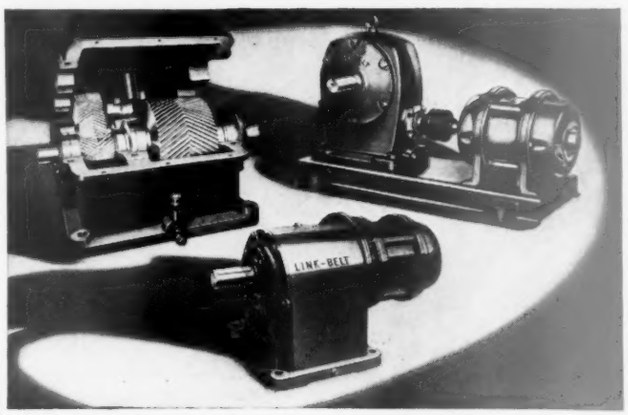
MORTON'S MODERN SANITARY DISPENSER delivers tablets one at a time. Morton's Salt Tablets are made of the most highly refined salt, pressed into convenient tablet form. Easy to take with a drink of water — dissolves in less than 50 seconds after swallowing.

Write for folder: "Heat Fag Among Workers."

DISPENSER
500 Tablet Capacity
$3.25
1000 Tablet Capacity
$4.00
Case of 9000 10-grain salt tablets, $2.60

MORTON SALT COMPANY
CHICAGO, ILLINOIS

LINK-BELT
SPEED REDUCERS



A Line that is Complete Unbiased Engineering Service

● The three improved types of reducer units included in the Link-Belt line—Herringbone Gear, Worm Gear, and Motorized Helical Gear—meet today's needs for the dependable transmission of power at accurate speeds. They are built in a large variety of sizes, ratios and horsepowers. Call in a Link-Belt positive drive specialist to help you select the most efficient unit for your requirements. Send for catalogs on these and other Link-Belt positive drives.

LINK-BELT COMPANY
Philadelphia, Chicago, Atlanta, San Francisco, Toronto, Indianapolis
Branch offices located in principal cities 8053

MARVEL

THERE IS NO EQUAL TO THIS

unbreakable BLADE

Unequalled for long-life and fast cutting performance, these blades, with an 18% Tungsten High Speed Steel edge welded to a tough alloy steel back, set the pace for all hack-saw blade performance. On any machine they will out-last and out-cut ordinary blades because they'll stand greater tension under heavier feeds, without danger of breakage. For accuracy, economy and better sawing, buy MARVEL Blades.

● Write today for information about the complete MARVEL line of hack sawing equipment, from hand frames to all-ball-bearing automatic sawing machines which have set new standards in faster hack sawing.

Armstrong-Blum Mfg. Co.
"The Hack Saw People"
5700 Bloomingdale Ave. Chicago, U.S.A.
Eastern Sales Office: 199 Lafayette St., New York

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Send Today for Your Copy of the new Fact-Jammed "SIGNODE GUIDE to Better Shipping"

Here is summarized in 4 pages to save your time, the Signode "Guide" to up-to-minute scientific packing and shipping methods. This new guide gives you in concise telegraphic style, the basic Signode Methods . . . tells how products of all weights, sizes, and shapes, from packages to carloads, are possible to ship at lower cost, safer with the Signode System.

Take this opportunity to check your present shipping practices against the latest proved Signode Methods, shown by means of illustration and concise text. Two minutes with this fact-packed guide may suggest possible improvements which can save you hundreds, perhaps thousands, of dollars annually in packing materials, time and labor . . . or help you save or gain new business from lower freight costs, revised freight classifications, or safer delivery of your product. Write today, requesting your copy of new Signode Guide to Better Shipping. Please mention product you ship.

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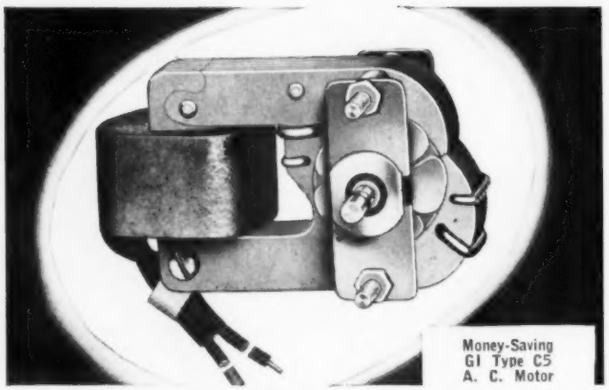

Money-Saving GI Type C5 A. C. Motor

"A Bee in Size . . . a Bear for WORK!"

ARE you looking for the real thing in low-cost, high torque, dependable miniature motor power? If so, test the GI Type C5 Motor. General Industries has been making low-cost, high-quality light electrical apparatus for over 38 years. This is one of the newest of our large line of motors. Simple, foolproof, small in size but a young giant for service. Precision built with speed torque tailored to your application. Your tests will find it tireless on the job—smooth running, with ample reserve power for dependably meeting all your demands in constant and varying loads. Equipped with friction-free oilless bearings. Made for all commercial A. C. voltages, 50 and 60 cycles. Count on it for extra-service life in fans, moving displays and any similar application.

Write us today for further information.

The GENERAL INDUSTRIES CO.
4044 TAYLOR ST., ELYRIA, OHIO

RIDE ALONG WITH McLaurin-Jones

PLANET BLUE STAR SEALING TAPE

Your first trial of PLANET Blue Star Sealing Tape is all we ask. Ride along once—and you'll ride regularly, for users of McLaurin-Jones PLANET Blue Star Tape are sure-fire repeaters. Some of the biggest shippers from coast to coast find PLANET Sealing Tape the sturdiest and safest. On the toughest, bumpiest rides PLANET grips hard . . . sticks like a leech . . . does the perfect sealing job! Try it . . . ask your paper merchant or write for free sample coil of PLANET Blue Star Sealing Tape!

McLAURIN-JONES CO. BROOKFIELD, MASSACHUSETTS
OFFICES IN NEW YORK, CHICAGO, LOS ANGELES

SALT DISFENSER

■ **It isn't the heat,** it's the salt loss that does the damage among workers doing hot, heavy work. Excessive salt loss from the body results in increased fatigue, lowered strength and efficiency.

One of the most important functions of salt in the body is to enable the cells, the blood stream, and the special fluid that bathes the brain and spinal cord, to hold the necessary amount of water. This is clearly proved by tests at the Youngstown Sheet and Tube Company. Sheet mill men drinking plain water weighed out 5.6 lbs. lighter after finishing their shift. Men drinking water with small amounts of salt added lost only a little more than a pound in the same time.

Keep one of these salt dispensers, manufactured by the Morton Salt Company, Chicago, Illinois, handy for your workers.

WHIRLWIND WIRE WHEEL BRUSHES

■ **A group** of high quality wire wheel brushes which are being made by a patented process in their own factory have been introduced by Van Dorn Electric Tools, Towson, Maryland.

These brushes, known as whirlwind wire wheel brushes, are outstanding for their quality and long life, both of which are apparent in the extra density of wire for any given width of brush.

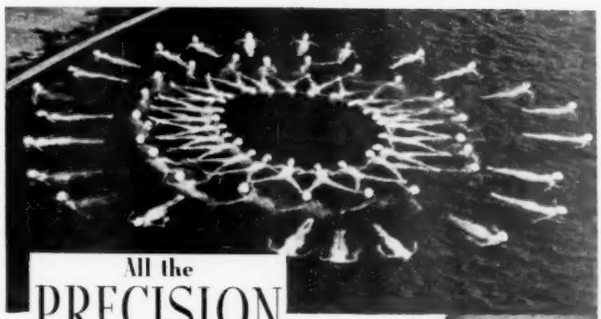
They are available in sizes, thickness and wire gages to suit practically any wire brushing application—coarse wire which is ideal for cleaning castings, removing scale, paint and rust, etc.; and fine wire which is best adapted to work on aluminum, brass, molds, auto body work, buffing and finishing.

NON-SLIP SHOE

■ **Ladder workers** will welcome the advent of a non-slip "shoe" designed to protect them from the dangers and discomforts of ladder climbing and standing.

As the illustration shows, the device consists of a sturdy steel plate which is held firmly against the sole of the wearer's shoe with strong leather straps. It has a slip-proof bottom of long-wearing rubber matting and a specially designed grooved arch that grips the ladder rung securely, contributing not only to comfort and safety but to foot-health as well.

Light in weight, it is convenient to carry and wear, and easy to walk in. It makes long hours of standing on a ladder as safe, comfortable and easy on the feet and muscles of the legs and back as standing on a wide, level platform or any floor.



All the
PRECISION
of Billy Rose's
Aquacade Ballet

Hours and hours of planning . . . weeks of preparation . . . practice, practice, practice. That's what spectacles like the Billy Rose World's Fair Aquacade are made of. And 25 years of precision tool manufacturing experience . . . endless research for new and better ways of doing things . . . constant contact with industry and industry's problems . . . that's what Dumore precision grinders are made of. No wonder they "steal the show" in the grinding field! If you are not familiar with what Dumore can do in your tool room or on your production line to bring savings in labor, time, spoilage, and overhead, write for catalog.

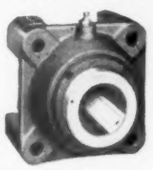
Dumore
PRECISION
Grinders

THE DUMORE CO.
Dept. 350-H,
Racine, Wis.

Only Dumore gives you all of these: Easy portability • speeds to 42,500 r.p.m. • wide selection of quick-change quills • 15 models to select from • 25-year background • distributors conveniently located.

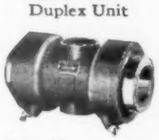
LINK-BELT
SHAFER
ROLLER BEARINGS

Pillow Block Mounting



Flanged Mounting

Duplex Unit



Drop Hanger Unit

Easier application—*automatic adjustment for shaft deflection or misalignment*

● These bearings realign themselves instantly within a total range of 3 degrees, yet housings are one-piece, strong and compact, because auxiliary alignment facilities are not needed. Available in a full range of types and sizes.

We also carry a complete line of babbitted and bronze-bushed bearing units.

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Your stationer has it in stock—Ask him for No. 900 Suede or No. 9000 Suede Whisk, the same efficient Weldon Roberts Eraser with a brush.

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Weldon Roberts Erasers
Correct Mistakes in Any Language

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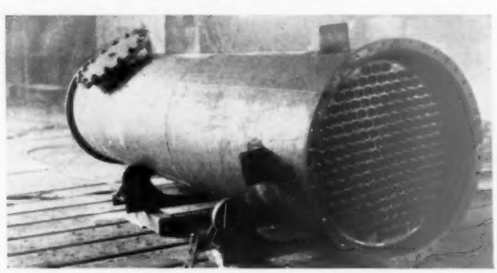
Every piece of Graver-Built equipment in the chemical process industries has gone on the job with a long heritage of sound engineering. The Quality materials and precision workmanship that go into every piece of Graver-Built equipment ensure steady, unfaltering service—service that you can depend on, always.

For a prompt quotation on fabricated steel or non-corrosive composite plate equipment, mail your specifications to Graver Tank & Mfg. Co., Inc., Dept. 21, East Chicago, Indiana.



Nickel-Clad Vacuum Condenser. Dia. 2 ft. 11 in. Length 11 ft. 4¼ in. Built for a leading chemical company.

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ADHESIVE SPEED—Orange Core Sealing Tape is gummed with a special animal glue that moistens and sets fast.

BULL-DOG GRIP—Orange Core Sealing Tape becomes "welded" to the box with a tough and tenacious grip.

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ORANGE CORE Sealing Tape

Moore & Thompson • Division Hudson Pulp & Paper Corp., 220 E. 42nd St., New York City

HIGH SPEED SPECIAL FILLER

■ **Unavoidable variations** in volume capacity of small size jars frequently cause serious difficulties because of overfilling or underfilling, when using automatic filling machines for free-flowing products, hot or cold, for proprietary, cosmetic, food, industrial and other products put up in jars, cans or other containers.

While an underfilled jar may contain full measure, it makes a bad impression on the purchaser. Overfilling causes the extra expense of cleaning spilled material from moving belts, jars and caps in addition to the cost of replacing discolored labels and refinishing jars by hand.

All these difficulties have been overcome by the high-speed special filler manufactured by Food Machinery Corp., Hoopeston, Ill., which has a type of control never before used. The control does not release a given volume like other fillers, but cuts off flow of material at a predetermined level. That is, it fills all containers to the same predetermined height, regardless of small variations in the capacity of containers.

UNBREAKABLE WICK FEED OILERS

■ **This oiler** is intended for economical use on machinery which operates intermittently. The lever at the top, when in a vertical position starts the feed and when "flipped" to the side shuts off the feed. No flooding and waste of oil when machine is idle. The oil supply is always visible and the crystal clear unbreakable reservoir tells at a glance when refilling is necessary.

When oiler is filled above the point where the wick enters the center tube, the surplus oil drains into the bearings, thus flushing it thoroughly. When the oil recedes to the opening in the tube, the wick automatically feeds oil to the bearing by capillary action. Dirt or sediment cannot enter the bearing.

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Over 45,000 accurately made sprockets in stock for immediate shipment. Special sprockets made to order.

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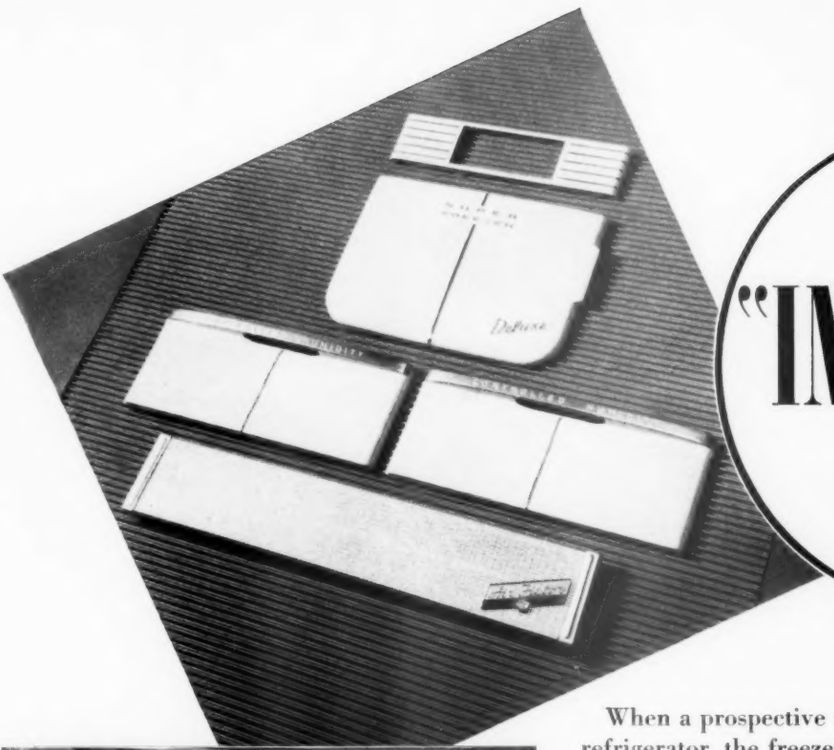

"INDURITE"

Helps Sales

When a prospective customer opens the door of this modern refrigerator, the freezer door and the trim instantly say—quality as well as good design and enduring beauty.

The door and trim are aluminum, finished in Scovill "Indurite" and enamel.

This "Indurite" finishing process* is adding new sales appeal to such widely separate aluminum products as lipstick containers, vanity cases, refrigerator and electric range trim, and endurance to automobile license plates, dipping forms for the rubber industry and screws for aviation requirements.

"Indurite" finish is an integral part of the metal surface. It is highly resistant to damage by scratching, perspiration, heat, cold, perfume and alcohol. The finish is available in a full range of colors as well as metallic finishes, such as bronze, silver and gold color.

"Indurite" can be used with frosted metal effects, with highly finished surfaces or with enamel.

This particular finishing process is available only on parts made from aluminum, but Scovill works in many metals, supplies drawn and stamped parts, metal assemblies, screw machine products, forgings and cold headed parts as well as completely assembled products.

Thousands of firms have used Scovill's designing, engineering and manufacturing facilities to advantage. These same facilities may be of value to you.

Write for the booklet "Masters of Metal" which tells the Scovill story in greater detail. Please address 42 Mill Street, Waterbury, Connecticut.

SCOVILL
Masters of Metal

Scovill

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WATERBURY, CONN.

** "Indurite" is a patented finishing process applied to aluminum products made to order by Scovill.*

Boston, Providence, New York, Philadelphia, Syracuse, Pittsburgh, Detroit, Chicago, Cincinnati, San Francisco, Los Angeles
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When writing Scovill Manufacturing Company please mention Purchasing

Yours

CATALOGS
BULLETINS LITERATURE
ON REQUEST
TO AID YOU IN PURCHASING

1– Grinding Wheels—Complete descriptive information about the manufacture, use and application of grinding wheels, including general recommendation tables and tables showing standard sizes and shapes are contained in a booklet offered by the Abrasive Company.

2– Skid-Load Process—A booklet indicating what manufacturers have accomplished with the use of low-cost, non-returnable steelstrapped wooden skid, with consequent benefits and savings to both shippers and receivers has been issued by the Acme Steel Co. How handling and shipping costs have been cut are also told.

3– Engine-Driven Pumps—To provide independently powered pumps for drainage, irrigation, gravel and coal washing plants, construction jobs, and similar applications, the Allis-Chalmers Mfg. Co. has introduced a line of centrifugal pumps driven by gasoline power units. Since these units are entirely independent of any outside source of power, municipal and private water suppliers use them as standby units in emergencies when other sources of power fail.

4– Steel Office Furniture—All your needs for steel equipment in shop and office can be filled from the All-Steel-Equip Company, Inc. line. A comprehensive catalog illustrating and describing their complete line is now available.

5– Fence for Industry—Protection against sabotage and control of personnel can be provided by a protective fence. A complete 48 page catalog showing several types of fences for industrial property is published by the Anchor Post Fence Company.

6– Casters—The constructional features and specifications of the many types of truck casters manufactured by The Bassick Company, are completely described in their catalog No. 121. In addition to semi-steel wheels, their casters can be supplied with their Baco or Atlasite floor protective wheels. The Atlasite wheel is resistant to the action of most chemicals, at the same time affording the floor protective features of rubber tread wheels.

7– Sharpening Stones—A booklet entitled, "How to Sharpen", is offered by Behr-Manning Corp. A careful perusal is bound to prove beneficial to teachers and students of industrial training, hardware and mill supply salesmen, as well as all lovers of good tools.

8– Fluorescent Lighting Equipment—A comprehensive catalog on fluorescent lighting equipment is offered by the Benjamin Electric Mfg. Co. Installation photographs, lamp data, and tables are included. Questions concerning fluorescent lamp operation are answered.

9– Forged Tools—A folder is offered by the Billings & Spencer Co. describing and illustrating their forged knurling tools. List prices are included.

10– Torque Indicators—Need for torque indicators, used for drawing up a bolt, or any series of bolts, to proper tension, has rapidly become accepted in the construction and servicing of equipment, in the plant, laboratory and field. Bulletin No. 40-T describing these indicators and offering counsel on torque problems, is distributed by Blackhawk Mfg. Co.

11– Crane Lubrication—The crane lubricating system manufactured by Blaw-Knox, is the one addition necessary to complete perfect crane mechanization. Typical installations on overhead cranes are shown in an attractive folder. Diagram of installation is shown on crane, as well as details and operation.

12– Lift Jacks—High speed, low cost handling is fast, safe, and simple with platforms and lift jacks manufactured by Bond Foundry & Machine Co. A folder containing specifications describes and illustrates this equipment.

13– Machine Parts—The hardware products line of machine parts distributed by Boston Gear Works, Inc., is listed in an 8-page bulletin. Complete specifications and list prices on crown-face pulleys, groove pulleys, cone pulleys, cast iron pillow blocks, Oilite equipped pillow blocks, ball bearing pillow blocks, shaft support and couplings are included.

14– Control Instruments—A complete line of modern thermometer and pyrometer controllers for gas, electric, and oil-fired industrial furnaces, kilns and ovens, are described in a bulletin published by The Bristol Co. Information regarding the various air and electrically-operated controllers available, automatic control valves, thermometer bulbs and thermocouples, is included.

15– Mechanical Flow Meters—The complete line of mechanical flow meters, indicators, recorders and air operated flow controllers, manufactured by The Brown Instrument Co., is covered in their catalog No. 2203.

16– Asbestos Insulated Duct—An engineering manual about Careyduct the all-asbestos air duct, is distributed by The Philip Carey Company. They will be glad to assist you in solving problems involving the use of this or any other of their products.

17– Diesel Engines—Various sizes of Diesel engines manufactured by Caterpillar Tractor Co., are shown in their 8-page bulletin. They are built in a complete range of sizes from 40 to 190 maximum brake horsepower. They are used singly or in multiple, to fill the requirements of a wide variety of power jobs.

18– Grinders—Speed, accuracy, lower maintenance, built-in skill are the features claimed for the hydraulic Universal grinding machines manufactured by the Cincinnati Milling Machine and Cincinnati Grinders, Inc. A colorful booklet tells the complete story in a dramatic way.

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POP'S ALL PRIMED TO POP!

MY PORE OL' GRAMMA COULD SMOOTH DOWN A HAMBONE WITH HER BARE GUMS FASTER THAN WHUT IKE'S DOIN' ON THAT CASTING WITH THE WRONG TYPE FILE!
TAKE A GANDER AT POP WHO SAYS SOME CONKS GET THE IDEA THERE'S ONLY TWO KINDS OF FILES.. FILIN' FILES AND CARD-INDEX FILES!
WILL SOMEONE PLEASE HAND IKE A NICHOLSON FOUNDRY FILE BEFORE POP SCUTTLES HIS BLOOD-VESSELS!
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***NICHOLSON** Files for every purpose,* is no empty phrase. With more than three thousand types, shapes and sizes, it definitely means that every Nicholson or Black Diamond File is *The RIGHT file for the job.* . . . Right in design, weight, cut, balance, "feel," hardness—and with each of these qualities so uniformly maintained that Nicholson can safely guarantee *Twelve perfect files in every dozen!*

Take foundry files: First developed for snagging castings, Nicholson and Black Diamond Foundry Files are carefully designed for removing fins, sprues and other hard projections; for filing narrow edges and sharp corners of dies, etc.

They're tough! They've extra-strong, rugged teeth; heavier set edges. Made to resist shelling off or breaking out, for fast stock removal . . . for long life and money saving! Regularly in bastard cut — Flat, Half-round, Round and Square — 8" to 18". Each file plainly stamped "Foundry" for ready identification.

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NICHOLSON FOUNDRY FILE. *(Stamped "Foundry" on side opposite trade-mark)*

NICHOLSON FILES

FOR EVERY PURPOSE

NICHOLSON U.S.A. MADE IN U.S.A.

Yours CATALOGS BULLETINS LITERATURE ON REQUEST

19– Shears—The exclusive features and steady performance of the shears manufactured by The Cincinnati Shaper Co., assure profitable returns from your machine tool expenditure. Their bulletin describes and illustrates the shears and also includes data and dimension sheets.

20– Materials Handling—How to determine where overhead materials handling equipment can be used profitably, is the subject of a bulletin offered by Cleveland Tramrail Division of The Cleveland Crane & Engineering Co. The elements of a materials handling system and the preparation of a simple layout are included.

21– Liquid Level Controllers—Five different methods of liquid level control are completely described in bulletin 2939 published by Cochrane Corp. Positive regulation of liquid level is highly important in providing smooth continuous operation and in assuring uniformity of finished product in processes.

22– Electrical Products—A listing of the entire line of electrical products manufactured by Colt's Patent Fire Arms Mfg. Co., is contained in an 84-page catalog. These include descriptions of safety switches, multi-breakers, service equipment, fuses and a complete listing of sizes "0" and "1" motor control units.

23– Contour Sawing—An interesting folder entitled, "8 Different Jobs Show Doall Advantages Over 8 Basic Cutting Methods," is offered by Continental Machines, Inc. This folder shows by actual photographs the comparison of their contour sawing method of removing metal with such conventional machining methods as shaping, turning, milling, nibbling and torch cutting.

24– Vari-Typer—A composing-type writer with changeable faces and spaces that your typist can operate is manufactured by Ralph C. Coxhead Corp. Send for a copy of their portfolio entitled, "How You Can Profit With the Vari-Typer."

25– Hand Tools—The tools manufactured by Crescent Tool Co. are described and illustrated in their catalog No. 23A. These include wrenches, pliers, screwdrivers, hack saws, tinner's snips, punches, chisels and other hand tools.

26– Steel—A folder containing useful data on cold rolled and cold drawn specialty steels is offered by Crucible Steel Company of America. The tables have been simplified by the exclusion of matter which does not apply to the higher carbon quality steels. Weight per thousand feet of cold rolled spring steel, hardness conversion numbers and decimal equivalents for various thickness gauges are included for ready reference.

27– Sprockets—A catalog issued by Cullman Wheel Co. will give you all information on sprockets and chains carried in stock, as well as engineering information and horsepower tables applicable to power transmission.

28– Fluorescent Lighting Fixtures—A complete and up to date catalog on the fluorescent lighting fixtures manufactured by DayBrite Lighting, Inc., is now available. Photographs of installations in diversified fields are included.

29– Safety Ladders—Safer overhead working is squarely your responsibility. Safety ladders for industrial and institutional use manufactured by Duo-Safety Ladder Corp. are described and illustrated in an 8-page folder. Ladders in use on typical jobs are shown.

30– Felt Pads—Simplified machine installation, lower maintenance costs, vibration and noise control in the industrial plant with Unisorb felt pads manufactured by The Felters Company, Inc., is explained in a comprehensive booklet. Typical installations on various types of machines are shown.

31– Floor Resurfacer—Go over the rough spots in your floor with ruggedwear resurfacer, product of Flexrock Company. It provides longer service, greater coverage and lower cost. It can be used for patching concrete to a feather-edge or resurfacing entire floors.

32– Steel Products—A 16-page illustrated bulletin, descriptive of the long wear-life qualities given to their "Five-point" Deephard processed steel products is offered by Foote Bros. Gear and Machine Corp. Engineering and testing laboratory data is given.

33– Capacitor Motors—Applications, construction, characteristics, modifications, ratings and advantages of General Electric Company general purpose capacitor motors, are given in their bulletin GEA-29152A.

34– Balancing Machines—A release of Gisholt Machine Co. performance data sheets includes case studies in metal-turning using automatic and turret lathes, and a typical example of static-dynamic balancing on a Dynetric Balancing Machine.

35– Rubber—Containing illustrations and descriptions of many of the most unusual modern uses for rubber, The B. F. Goodrich Co. has issued a 30-page booklet entitled, "Typical Examples of Goodrich Development in Rubber."

36– Hack Saw Blades—The G. W. Griffin Company has a wide selection of all types of hack saw blades for every use, namely, soft, hard, non-strip, special alloy and high-speed steel. Their non-strip type is the newest addition to the line. It is recommended for cutting conduit, thin sheet metal, etc.

37– Valves—A steel valve built with an integral seat for the intermediate pressures, up to 600 lbs., manufactured by Hancock Valve Division, Manning, Maxwell & Moore, Inc., is described and illustrated in a 4-page folder.

38– Paint—Casein paint, manufactured by Harrop Chemical Co., is easy to use, extremely economical, comes in beautiful, clear, permanent colors, can be used on any wall surface, is washable, cuts cost of artificial lighting, and rooms may be used the same day. A folder showing colors and listing the many advantages is yours for the asking.

39– Motors—A series of bulletins on motors manufactured by Howell Electric Motors Co. are now available. These cover Polyphase squirrel cage types sleeve and ball bearing up to 150 hp., Type EK Polyphase and single phase explosion-proof motors, built in sizes ½ to 50 hp., and passenger and freight elevator motors. They are all precision built and precision tested.

40– Electric Solderer—No preheating is necessary with the electric solderer manufactured by Ideal Commutator Dresser Co. Heating stops instantly and is safe to use. It uses current only when in actual contact with work.

41– Switchgear—An interesting bulletin entitled, "New S. S. America of the United States Line Sets High Standard for Operating Safety," is being distributed by the I-T-E Circuit Breaker Co. They have contributed in the making and protection of electrical equipment for normal and emergency use. Installation photographs of their switchgear are included.

42– Speed Reducers—Motorized speed reducers manufactured by D. O. James Mfg. Co. are described and illustrated in their catalog No. 18. Sectional views are included as well as selection tables.

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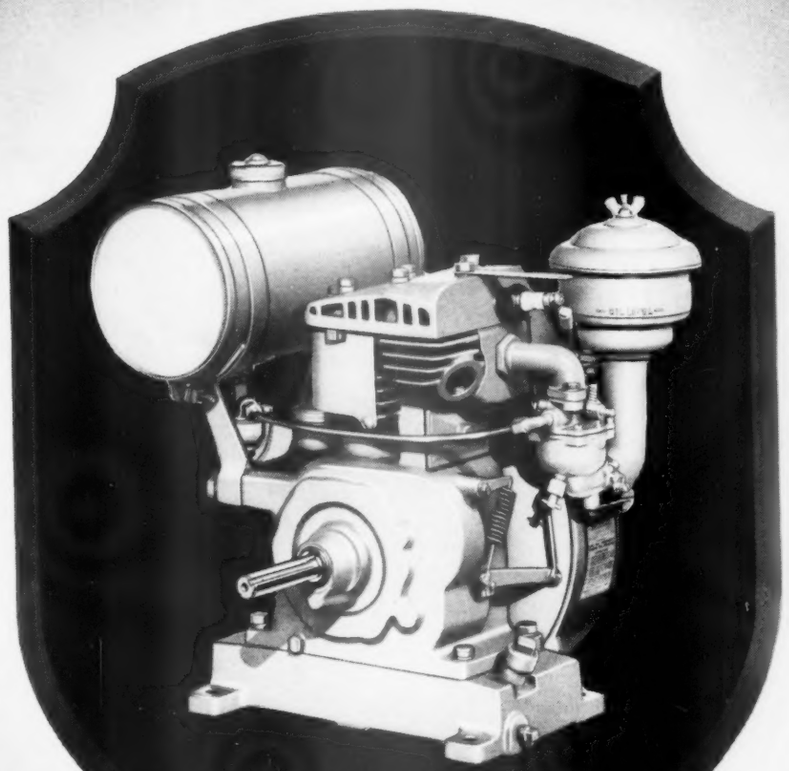
again MORE HORSEPOWER PER DOLLAR



Wide range of models and types
⅔ HP. to 6 HP.

Greater Operating Range • More Flexible Power • Better Performance

Power that fully satisfies every performance demand — thrifty with gasoline under all conditions—Briggs & Stratton Air-Cooled Gasoline Motors deliver more horsepower per dollar—more motor value — in each power range.

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Machines and equipment powered by Briggs & Stratton do a better job — at lower cost — look to Briggs & Stratton 4-cycle Air-Cooled Gasoline Motors for every application requiring ⅔ HP. to 6 HP.

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4 CYCLE BRIGGS & STRATTON GASOLINE MOTORS

IT'S POWERED RIGHT WHEN IT'S POWERED BY BRIGGS & STRATTON

Yours CATALOGS BULLETINS LITERATURE ON REQUEST

43– Tool Steels— A chart giving the brands of tool steels recommended for various tools, dies and other applications, has been issued by the Jessop Steel Co. Over 150 applications are listed with recommended tool steels indicated.

44– Band Saws— Continuous cutting action makes the band saw the most modern and efficient method for 95% of cut-off work. A folder issued by Kalamazoo T & S Co., describes and illustrates their metal cutting band saw, which they claim quickly pays for itself in savings.

45– Diamond Tools— A folder is offered by E. Karelsen, Inc., which describes and illustrates some of their products. These include diamond tools, shaped diamond tools, emery wheel dressers, diamond mounted drills, diamond pantograph points, diamond engravers' points, glaziers' diamonds, hand optical lens cutters, watch crystal cutting diamonds, circle machines, oval machines, watch crystal cutting machines, etc.

46– Asbestos— An illustrated compilation of unusual, historical incidents about asbestos, dating back to the 5th Century B.C., is offered by Keasbey & Mattison Company, entitled, "Legends of Asbestos."

47– Laboratory Table-Top Finish— Laboratory furniture extremely resistant to a wide range of corrosive chemicals and solvents, is discussed in an 8-page bulletin issued by Kewaunee Mfg. Co. A comprehensive list of reagents to which this finish has been subjected is given. Heat resistance and abrasion tests are also discussed.

48– Bronze— Engineering applications of D-H-S bronze are described and discussed in a leaflet published by Koppers Company, Bartlett Hayward Division. Recommended uses are listed and a table gives minimum physical properties for D-H-S bronze No. 1, 2, 3 and 4.

49– Canvas Baskets— Patent steel frame canvas baskets, shipping hampers, trucks and casters for mills, factories, department stores and warehouses, manufactured by W. T. Lane & Bros., Inc., are described and illustrated in a handy booklet. Constructional features and specifications are included as well as price lists.

50– Thermocouples— A 40-page catalog on thermocouples issued by Leeds and Northrup Co., not only lists a comprehensive line of assemblies with their parts and accessories, but includes information of general usefulness on the correct choice of couples.

51– Vibration Dampener Bushing—A bulletin describing the vibration dampener bushing resilient mounting now being built into Manhattan wheels for portable grinders, has been issued by The Manhattan Rubber Mfg. Division. Ten advantages are listed including the elimination of vibration, better finish, less fatigue, and increased production.

52– Wire Cloth— Every variety of wire cloth possible to weave is manufactured by the Michigan Wire Cloth Co. Their illustrated catalog covers all types of screens from the coarsest to the finest mesh and in all kinds of metal including iron, steel, stainless steel, spring steel, copper, brass, commercial bronze, phosphorus bronze, pure aluminum alloy, nichrome, nickel silver, pure nickel, monel, manganese and special alloys.

53– Fluorescent Lighting— A catalog section presenting fluorescent troffers, fluorescent lighting in its most advanced form, is offered by The Miller Co. As a continuous trough or as individual unit, they provide efficient illumination in areas heretofore considered extremely difficult to light and allows the use of higher levels of illumination in general.

54– Industrial Gas Masks— The complete line of industrial gas masks, supplied with the all-vision facepiece, is described in an illustrated bulletin distributed by Mine Safety Appliances Co.

55– Ball Bearing Lubrication— As an aid to choice of the correct lubricants for ball bearings, New Departure Division General Motors Sales Corp., offers a 15-page booklet covering the selection and application of both oils and greases. Particularly useful is a simple method of determining the proper grade and viscosity of oil for various operating temperatures and bearing speeds.

56– Diamond Wheels— A handbook on reconditioning and sharpening single point cemented carbide tools rapidly and economically is offered by Norton Co.

57– Whiteprint Machine— A 6-page illustrated bulletin covering the Model "F" fast-printing whiteprint machine has been issued by the Ozalid Corp. The machine is a printer-developer combination, accommodates materials up to 42" wide and has a maximum printing speed of 56" per minute. Technical features are illustrated in the bulletin.

58– Electric Controls— Rugged and efficient high-speed controls used for most industrial applications, such as counting, conveyor control, machinery safeguards, signal and alarm systems, motor or valve control, inspection, break detection, as well as automatic controls for hundreds of specialized industrial processes are manufactured by Photoswitch, Inc.

59– Paper Gage— A precision instrument for measuring the thickness of paper as it comes off the machine is described and illustrated in a bulletin issued by Pratt & Whitney. It is a new step in paper making.

60– C. O. D Express Service— For quick cash returns, ship C. O. D. by fast, dependable railway express. A folder distributed by the Railway Express Agency lists charges for collecting and returning C. O. D. money. You can get complete, fast, nation-wide service, including pick-up at your door and delivery direct to your consignee without extra charge.

61– Steel Floorings, Gratings— The advent of steel grating and treads in industrial, public and marine projects has enabled architects and engineers to design floors containing such advantages as light weight, maximum carrying capacity, ventilation, sanitation, light, self-cleaning, head-room, non-skid safety, etc. A booklet on grating, bridge floors, and armoring treads, is offered by Reliance Steel Products Co.

62– Stainless Steel— "The Welding of Republic Enduro Stainless Steel" is the title of a 20-page booklet released by Republic Steel Corp. It contains data on the welding of stainless steel by various commercial methods, including electric arc, atomic hydrogen, flash, projection, seam, spot and gas.

63– Steel Unions— A 6-page circular which features standard cold-forged steel unions with 2 silicon bronze, 2 stainless steel, or 2 Moly steel seats, has been released by Rockwood Sprinkler Co. How to pick the right union for your piping needs is explained.

64– Cold Finished Bars— A bulletin published by Joseph T. Ryerson & Son, Inc., gives a complete description of the wide range of cold finished steel bars carried in stock for immediate shipment. Chemical analysis, working properties, suggested applications and other interesting data is included.

65– Spraying Equipment — The complete line of industrial spray nozzles, spray guns and atomizing spray heads to cover a wide range of application problems involving all kinds of liquids, manufactured by Spray Engineering Company, is covered briefly in their catalog. Special types of spray guns and accessory items have been developed for use with a large variety of dry, powdered materials.

TO RECEIVE THESE BULLETINS CHECK COUPON OR POSTCARD

FOR INCREASED PRODUCTION Keep Your Light Levels UP

with This Low-priced Voltage Regulator

Ready for increased production. Three G-E Type AIRS regulators in this large industrial plant keep lighting at top levels. Installation costs and space requirements were minimized by placing the regulators, together with G-E Pyranol transformers, on overhead platforms.

WHEN the voltage of the lamp circuits in your plant drops off, your light drops off even more—in most cases nearly *three times as much.* That's why proper voltage control is vital if high light levels, and consequent high efficiencies, are to be maintained. And that's why G-E air-cooled automatic induction voltage regulators are finding increased use as reliable, low-cost aids to better lighting.

Their compact construction and light weight make out-of-the-way installations easy. They can be installed indoors without costly fireproof vaults. First cost is low—and maintenance is practically negligible.

Higher plant illumination with *regulated voltage* can pay big dividends in higher production. Call your G-E representative *now.* He'll be glad to help you select the proper regulators to keep light levels *up.* General Electric Company, Schenectady, N. Y.

Write for Bulletin GEA-3057

GENERAL ELECTRIC

404-14

Yours CATALOGS BULLETINS LITERATURE ON REQUEST

66– Magnetic Separators — The high duty type "L" magnetic separator especially designed for cleaning secondary metals, such as brass and aluminum borings and turnings from iron and steel particles, reclaiming mixed materials and purifying materials from contained iron, is described in a bulletin issued by Stearns Magnetic Mfg. Co.

67– Winches—Hand and motor winches for lifting and pulling loads up to 3,000 lbs., are covered in a bulletin issued by Stephens-Adamson Mfg. Co. Typical application photographs are shown as well as dimension drawings.

68– Renewable Fuses — Modernize your old fuses with the Signalite fuse converter, product of Signalite Fuse Co. The Neon warning signal automatically shows when the fuse blows. There is a size and type for every industrial need.

69– Belt Treatment —No longer do you have to tolerate unsatisfactory belt transmission. An increase of power actually obtained with a Taccalin conditioned belt means greater production in your plant. Product of Taccalin Chemical Corporation.

70– Fuse Clips Clamps— "Worth Their Weight in Gold" is the title of an informative broadside on Trico Fuse Mfg. Co. clamps for fuse clips. It tells how poor contact wastes millions of dollars, where to look for the trouble and how premature fuse blowings arcing at contacts, wasteful shutdowns and unnecessary loss of production can be eliminated.

71– Combination Starters—A circular describing their magnetic combination starters has been released by The Trumbull Electric Mfg. Co. It has motor disconnect and magnetic starter in one enclosure. Unique and exclusive features of construction are contained in circular.

72– Transmission & Conveyor Belts—A 36-page booklet describing the company's complete line of transmission and conveyor belts has been published by the Mechanical Goods Division, United States Rubber Co.

73– Threadless Bronze Fittings—The safest and fastest way of making a tight non-ferrous joint is to use the Walseal Silbraz fitting, manufactured by the Walworth Company. Installations in representative industries are shown in a series of booklets, together with illustrations, descriptions, sizes and dimensions, of the diverse types of valves and fittings made by them.

74– Air Cooled Transformers — A 12-page illustrated leaflet describing the Type ASL air cooled transformers for 60 cycle service in the 13,200 volt class and below and in ratings up to 500 kva for single phase operation and 1000 kva for three phase operation has been published by the Westinghouse Electric & Manufacturing Company.

75– Steel Drills— A circular showing their various types of high speed and carbon steel drills manufactured by them has been issued by Whitman & Barnes. Of special interest are the descriptions and illustrations of several types of drills in the jobbers' range especially designed for drilling various metals and materials. Illustrations are shown of recommended types of drill points for successful and productive drilling.

76– Arc Welding Electrodes — A useful guide in helping to make quick, sure selections of proper electrodes for all classifications of welding work, has been prepared by the Wilson Welder and Metals Co., Inc. It reviews the general description, application, procedure for use and physical properties for numerous and varied welding purposes.

77– Straight Line Exhausters — For handling air containing steam, dirt, fumes, paint, spray, grease, vapors, etc., a straight line exhauster has been developed by the L. J. Wing Mfg. Co. It is available in horizontal or vertical design, with belt drive which permits selection of any fan speed to fit any condition of air volume and resistance.

78– Lighting and Wiring Equipment— The application of fluorescent lighting, use of multi-outlet assemblies for industrial use, overflow raceway wiring systems, surface metal raceway wiring systems and signal wiring, are all covered in bulletin issued by The Wiremold Company.

79– Hoisting Equipment— Complete information pertaining to various models of chain hoists manufactured by Yale & Towne Manufacturing Co., is contained in their catalog PD-25. How to select the proper type of hoisting equipment is an important feature.

80– Paint Brush Preservers — The most efficient, safe and economical method of preserving brushes is claimed for the paint brush preservers manufactured by Yenne & North Mfg. Co. A pamphlet which describes and illustrates this is available upon request.

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F.O.B. *filosofy of buying*

CALLERS at the office of the Binks Manufacturing Co., Chicago, these days are greeted by the timely and forthright declaration of policy shown in the photograph herewith. It's a good policy, and a mighty healthy move on the part of management to give it this prominence. F.O.B. commends it to the attention of all purchasing men as a substitute for, or an addition to, the perfunctory declarations of welcome and courtesy or the statement of calling hours, which customarily adorn reception rooms. The notice, preminently displayed under two American flags, reads:

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The American Flag flies daily over this institution because it is an American institution.
The only "ism" we recognize is
AMERICANISM
We care not what your politics, religion or nationality may be, but you must be a citizen of the United States and a loyal AMERICAN to work here.
J. F. Roche,
President.

•

BY the way, one old, familiar slogan which we have missed in this period of national consciousness is "Buy American." Instead, the emphasis for months past has been put on buying as many essential foreign materials as we can get our hands on while they are still to be had. And meanwhile, a good many foreign powers are exceedingly anxious to "Buy American" and our own State Department is diligently promoting foreign trade arrangements.

Another war note: The Massachusetts press quotes State Purchasing Agent George J. Cronin as grumbling, "C'est la guerre," as he studied a prospective annual increase of $200,000 in the state's fuel bill. Major Cronin, who has an impressive record of overseas service in the World War as well as an excellent record in public purchasing, is eminently entitled to express his feelings in a bit of army French.

•

LAST month, this column noted the complications in Texas county purchasing precipitated by the 1940 census, due to legislation based on population statistics. The situation, it appears, is not peculiar to Texas, and similar circumstances have arisen in Allen County (Fort Wayne) Indiana, where the purchasing office is likewise jeopardized by population change, but will carry on until a definate ruling is made.

AN interesting bit of history regarding municipal budgets and spending is recounted in the Cambridge (Mass.) *Sentinel* of August 24th, under the caption, "Constructive Politics." Says the item:

"How many in Cambridge know that ancient grievance to efficiency in city direction, the $9 per $1000 out of the tax rate for separate public school maintenance, has been discarded these two years?

"It was invented some three decades ago by that conscientious student of civics, Prof. Jos. H. Beale of the Harvard Law School, when a member of the School Committee, on the theory that if the School Committee were to spend their own budget, rather than have the Mayor and Council decide what should be spent each year for school maintenance, it would take the 'schools out of politics'. Like many other 'well laid schemes of mice and men,' the result did not dovetail with the intent, and for these years the School Committee has been getting a definite chunk out of the tax levy, $9 per $1000, until two years ago, when Representative Wm. D. Hillis put an act through the Legislature which permitted the Mayor to pass on a school appropriation, and requiring a vote of five members to nullify an executive veto. (Chap. 182 of the Acts of 1938.)

"This legislation, which, by the way, was retroactive in nature, blotting out any previous special legislation affecting the Cambridge system, put a quietus to the special powers giving the School Committee exclusive spending of an annual sum designated as $9 per $1000, out of the total tax levy. All the cities in the state except Boston and Lynn place the mayor and council in charge of all department estimates, including schools. The Hillis act of 1938 places the council quite outside, giving the executive veto power over the committee's budget estimates.

"The weakness of the Beale system lay in the failure to place responsibility. If a School Committee in secret session played with the people's money, there was no effective way to put a punitive fist upon the guilty.

"With the Hillis system, the mayor is empowered to interfere through the veto process. *The centering of responsibility in spending public money is a fundamental caution.* Officials are apt to be careful where they cannot escape public scrutiny of their acts."

An interesting sidelight on this occurrence is that former Representative Wm. D. Hillis, the young legislator who recognized the need of departmental budgets logically and openly compiled and of centralized responsibility for the spending of public funds, and who instituted rational safeguards in place of theory and tradition, is now continuing his public service as City Purchasing Agent Hillis of Cambridge.

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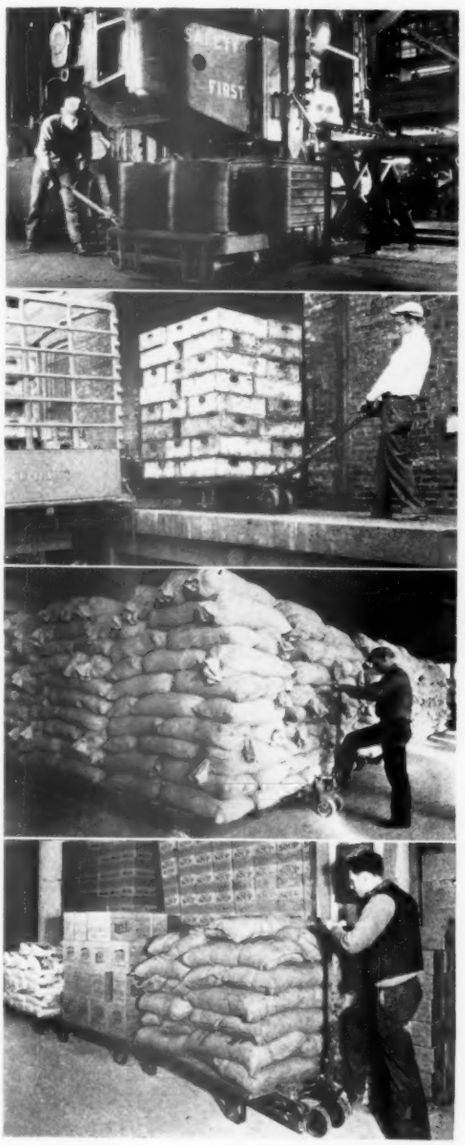

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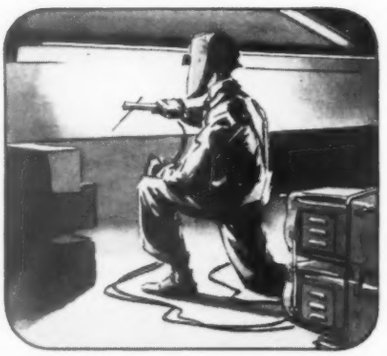

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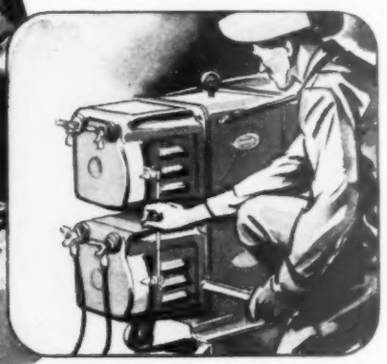
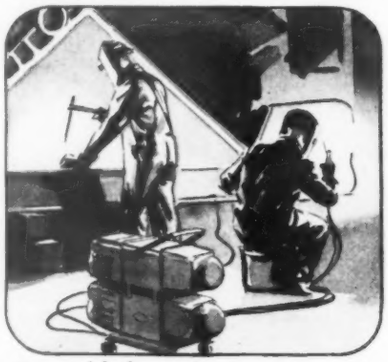


• Finished with special high amperage job, operator unhooks parallel circuit, loosens "multiple shifter." It takes only a few seconds —



• — and both operators now resume regular work with separate services of 200 amps. each. No need here for special amperage machines.

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